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U. S. DEPARTMENT OF COMMERCE
BUREAU OF FISHERIES

REPORT
OF THE
UNITED STATES COMMISSIONER OF FISHERIES
FOR THE FISCAL YEAR 1932
WITH
APPENDIXES

HENRY O'MALLEY
Commissioner

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ERRATA

Page 97, second column, line 11: Rhode Island should be given as page *177* instead of page *178*.

Page 241: Under the box head "Salem" the value for shad should be *$17,230* instead of *$7,230*.

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U.S. DEPARTMENT OF COMMERCE

BUREAU OF FISHERIES

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REPORT OF THE COMMISSIONER OF FISHERIES

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Department of Commerce,
Bureau of Fisheries,
Washington, July 1, 1932.

The honorable the Secretary of Commerce.

Dear Mr. Secretary: I have the honor to submit the following résumé of the operations of the Bureau of Fisheries during the fiscal year ended June 30, 1932.

The fishing industry in all its branches has suffered severely in common with other producers of foodstuffs. The extensive decline in prices, especially of those products with which fish normally compete in the retail markets, has faced the industry with actual disaster. The complexity of the system of fish distribution, seasonal character of supply, remoteness of centers of production from population centers, and the limitation of the consumption of fish combine to make it most difficult for fishery operators to compete at present price levels. The temporary scarcity of some staples has tended to keep up the cost of production and added to the difficulties of the producers of such products. On the other hand, advances in quick freezing, the packaging of fresh and frozen fish, and the value of marine products in the diet in combating faulty nutrition are tending to popularize fishery products with the consuming public. With the development of improvements in fish manufacture and merchandising, especially with respect to adequate display and refrigerating equipment suitable for handling quick-frozen foods satisfactorily and their more general installation in retail stores, and the education of the public to a realization that frozen foods can be fully as sound, palatable, and nutritious as the fresh products, we may expect this branch of the fishery trade to become more stabilized.

Our industrialization has created conditions making it more difficult to keep our waters adequately stocked with aquatic life. To overcome these handicaps the number of Federal, State, and private fish-cultural units has been increased. There are 87 Federal stations and substations in 36 States and the Territory of Alaska and about 390 State hatcheries. In addition, there are 130 private trout hatcheries, about 45 goldfish farmers, and several hundred clubs raising fish for stocking purposes.

The output of fish and eggs by the bureau's propagation units exceeded 7,000,000,000, representing a slight decrease as compared with the previous year. The take of fur-seal skins on the Pribilof Islands in 1932 again exceeded 49,000, being slightly less than in 1931.

Commercial fishing is prosecuted on the high seas, along our entire coast line including Alaska, on the Great Lakes, and in interior waters. These fisheries during the calendar year 1930 furnished employment to about 120,000 fishermen and 84,000 persons engaged in transporting, manufacturing, and the wholesale trade, making a total of 204,000 persons who depend directly upon our fisheries for a livelihood. This was about 13,000 more than were employed during the previous year. The catch in 1930 amounted to 3,286,580,000 pounds for which the fishermen received $109,349,000—a decrease of 8 per cent in amount and 11 per cent in value as compared with the previous year.

In the calendar year 1930 the output of canned fish amounted to 576,685,000 pounds, valued at $82,858,000, and in 1931, 506,414,000 pounds, valued at $62,949,000. The output of fresh, frozen, and smoked packaged fish in 1930 exceeded 80,000,000 pounds, valued at $12,580,000, as compared with 65,551,000 pounds, valued at $9,224,000 in 1931. In these two years the amounts of fish frozen were 139,297,000 and 112,257,000 pounds, respectively, and the value of by-products $23,721,000 and $16,565,000, respectively. Imports of fishery products for consumption were valued at $50,830,000 in 1930 and $43,033,000 in 1931, while the value of domestic exports was $17,276,000 and $11,574,000, respectively.

INTERNATIONAL RELATIONS

REVISED NORTHERN PACIFIC HALIBUT CONVENTION

Despite the comparatively recent origin of the eastern North Pacific halibut fishery and the fact that the fishing area has been increased from 500 miles of coast line in 1910 to 2,000 miles in 1930, the fishery is in a serious condition as indicated by the following facts: (1) Regardless of the great expansion in fishing areas, the annual catch has remained nearly the same; (2) the fishing power of the fleet has been increased from 200,000 sets of gear units in 1910 to 1,000,000 sets in 1930 to maintain this level of production; (3) the catch on the southern grounds has fallen from a maximum of 60,000,000 pounds in 1912 to 22,500,000 pounds in 1930, and from the grounds in the Gulf of Alaska from a maximum of 26,000,000 pounds in 1924 to 17,500,000 pounds in 1930; (4) the catch per set of gear on the oldest areas fished has fallen from 260 pounds in 1906 to 36½ pounds in 1931; (5) the decline in abundance is also taking place on the newer grounds, and the fishery is now dependent upon constantly smaller sizes of fish; (6) eggs and larvæ are almost absent from the southern grounds, and the spawning schools are much reduced on the newer banks.

The enabling act approved May 2, 1932, putting into effect the revised convention, which was signed on May 9, 1930, and became effective May 9, 1931, follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE

SECTION 1. That this Act may be cited as the Northern Pacific Halibut Act.

DEFINITION OF TERMS

SEC. 2. For the purposes of this Act " close season " shall mean the period from the 1st day of November in any year to the 15th day of February in the next following year, both days inclusive, unless this period or any part thereof shall be opened to fishing by regulation of the International Fisheries Commission, as empowered by the provisions of the Convention for the Preservation of the Halibut Fishery of Northern Pacific Ocean and Bering Sea, signed on behalf of the United States of America and the Dominion of Canada, May 9, 1930, or any other close season hereafter established by the International Fisheries Commission in accordance with the provisions of that convention; "territorial waters of the United States" shall mean the waters contiguous to the western coast of the United States and the waters contiguous to the southern and western coasts of Alaska; "territorial waters of Canada" shall mean the waters contiguous to the western coast of Canada; and "convention waters" shall mean the territorial waters of the United States, the territorial waters of Canada, and the high seas, including Bering Sea, extending westerly from the limits of the territorial waters of the United States and of Canada.

FISHING UNLAWFUL; WHEN

Sec. 3. It shall be unlawful for any person to fish for, or catch, or attempt to catch, any halibut (Hippoglossus) at any time in any of the territorial waters of the United States closed to fishing under the provisions of the abovementioned convention or by any regulations adopted in pursuance thereof, or under the provisions of this Act, or for any national or inhabitant of the United States to fish for, or catch, or attempt to catch, any halibut at any time in any of the convention waters so closed to fishing, or to violate any regulations established pursuant to the authority of the convention. The unintentional catching of halibut, when legally fishing for other species of fish, shall not constitute a violation of this Act if such halibut shall be used for food by the crew of the vessel catching the same, or be landed and immediately delivered to any official duly authorized by the Secretary of Commerce of the United States to accept delivery, or delivered to the proper authorities of the Dominion of Canada The halibut delivered to any official of the United States pursuant to the provisions of this section shall be sold to the highest bidder for cash and the proceeds therefrom, exclusive of necessary expenses in connection therewith, shall be covered into the Treasury of the United States.

UNLAWFUL PORT USE; DEPARTURES

Sec. 4. No person, firm, or corporation shall use any port of or place in the United States to furnish, prepare, or outfit any vessel, boat, or other craft intended to be used in violation of the Convention for the Preservation of the Halibut Fishery or in violation of this Act, nor shall any person permit, or cause to be permitted, any vessel, boat, or other craft intended to be used in violation of the said convention or of this Act to depart from any port of or place in the United States.

UNLAWFUL PORT ENTRY; POSSESSION

Sec. 5. It shall be unlawful for any vessel, boat, or other craft having on board any halibut caught contrary to any of the provisions of the said convention or of this Act to enter any port or place in the United States, or for any vessel, boat, or other craft to enter any such port or place while upon or in the prosecution of any voyage during which the vessel, boat, or other craft fished or was used in fishing for halibut in convention waters closed to fishing. It shall be unlawful for any person knowingly to have in his possession in any port of or place in the United States or in any territorial water of the United States any halibut unlawfully caught under the provisions of the said convention or of this Act. It shall also be unlawful for any person to land in any port of or place in the United States halibut caught in convention waters during any period closed to fishing.

PENALTY

Sec. 6. Any person violating any of the provisions of the said convention or of this Act shall be fined not less than $100 or more than $1,000 or imprisoned not more than one year, or both.

PATROLS; SEARCHES

Sec. 7. The President shall cause a patrol of naval or other public vessels designated by him to be maintained in such places and waters as to him shall seem expedient for enforcing the said convention and this Act, and any officer of any vessel engaged in such service, and any other officers designated by the President, may stop, board, and search any vessel, boat, or other craft in the territorial waters of the United States and any vessel, boat, or other craft of the United States on the high seas when suspected of having violated or being about to violate any of the provisions of the said convention or of this Act.

CANADIAN VESSELS AND NATIONALS

SEC. 8. Every national or inhabitant and every vessel, boat, or other craft of Canada found violating the said convention or this Act shall be delivered as soon as practicable to an authorized official of Canada at the nearest point to the place of seizure or elsewhere as the officials of the United States seizing the same and the authorized officials of Canada may agree upon, and the witnesses and proof necessary to the prosecution of said persons and vessels of Canada shall be furnished with reasonable promptitude to the authorities of Canada having jurisdiction thereof.

SEIZURE AND FORFEITURE

SEC. 9. Every vessel, boat, or craft, employed in any manner in violating any of the provisions of the said convention or of this Act shall be seized by any collector, surveyor, inspector, officer of a revenue cutter, or person specified in section 7 hereof, and except as provided in section 8 hereof, every such vessel, boat, or craft, including its tackle, apparel, furniture, cargo, and stores, shall be forfeited to the United States by proper proceedings in the district court of the United States, including the United States District Courts of Alaska, in the judicial district in which the violation is alleged to have occurred; or in the United States district court in the nearest judicial district within the United States, if the violation is alleged to have occurred outside the territorial waters of the United States.

FISHERIES COMMISSION EXEMPTION

SEC. 10. None of the inhibitions contained in this Act shall apply to the International Fisheries Commission when engaged in any scientific investigation.

DURATION OF ACT

SEC. 11. This Act shall take effect immediately and shall continue in force until the termination of the convention signed by the United States and the Dominion of Canada, on May 9, 1930, for the preservation of the halibut fishery of the northern Pacific Ocean and Bering Sea.

Approved, May 2, 1932.

INTERNATIONAL PASSAMAQUODDY FISHERIES COMMISSION

The International Passamaquoddy Fisheries Commission appointed by the joint resolution of Congress approved June 9, 1930, completed its organization and vigorously prosecuted studies regarding oceanic circulation and the source and abundance of nutritive substances found in the sea water of the vicinity of Passamaquoddy Bay. Studies on the abundance of phytoplankton and zooplankton as a source of fish food in relation to the physical and chemical states of the water in the Bay of Fundy and along the coast of Maine were also prosecuted throughout the year.

Except for the loss of the first year's records on physical and chemical oceanography of the region in the disastrous fire of March 9, 1932, destroying the main laboratory building of the Atlantic Biological Station at St. Andrews, where the investigative staff maintained headquarters for part of the year, investigations have progressed satisfactorily. During the midwinter season laboratory facilities were provided at the Woods Hole Oceanographic Institution, Woods Hole, Mass. The bureau's motor ship *Pelican*, the *Prince* belonging to the Biological Board of Canada, and the chartered Canadian motor vessel *Nova IV* have been used in the investigational work.

MULTILATERAL CONVENTION FOR THE CONSERVATION OF WHALES

Certain species of whales are practically extinct. The threatened extermination of other species chiefly hunted by modern whalers through the increasing intensity of whaling operations in practically all seas of the globe has aroused biologists in this country and abroad to the need for scientific study to determine control measures to prevent extinction and safeguard investments in this great industry. In September, 1927, the economic committee of the council was instructed by the assembly of the League of Nations, Geneva, Switzerland, to study the protection of marine fauna and to decide with the aid of experts " whether and in what terms, for what species and in what areas international protection of marine fauna could be established." The outcome of these studies culminated in the unanimous adoption of a draft convention for the regulation of whaling, the main object of which was to secure the adoption of certain rules to prevent the destruction of the whaling industry as a source of wealth by the greatest possible number of countries. On September 19, 1931, the convention was opened for signatures.

The convention will apply to all the waters of the world including both the high seas and territorial waters, except that any high contracting party may require a license of any vessel desirous of using its territorial waters subject to such provisions as may be deemed necessary or desirable, regardless of the nationality of the vessel. The convention will apply only to baleen or whalebone whales, including the finback, blueback, humpback, and right whales and not the toothed whales such as porpoises, dolphins, killer, and sperm whales. It will prohibit the taking or killing of right whales, which include North Cape whales, Greenland whales, southern right whales, Pacific right whales, and southern pygmy right whales. It also prohibits the killing of calves or suckling whales, immature whales, and female whales accompanied by calves or suckling whales.

The convention will require the fullest possible use of the carcasses of captured whales, including proper equipment for the extraction of the oil from all blubber and from the head and tongue, and at shore stations the use of all residues after the oil has been extracted. Vessels engaged in whaling must be licensed by the high contracting party whose flag they fly. Such vessels must furnish the most complete biological data practicable, including date and place of capture, species, sex, length, and other information. Each high contracting party shall obtain from all factories, on land or afloat, under its jurisdiction, returns of the number of whales of each species taken, the amounts of oil of each grade, and the quantities of meal, guano, and other products derived from them and shall communicate such data, including biological data, the name and tonnage of each floating factory, the number and aggregate tonnage of the whale catchers, and a list of the land stations in operation to the International Bureau for Whaling Statistics at Oslo, Norway, at convenient intervals, at least annually.

The convention shall enter into force on the thirtieth day following the receipt by the secretary general of the League of Nations of ratifications or accessions on behalf of not less than eight members of the league or nonmember states, including the Kingdom of Norway and the United Kingdom of Great Britain and Northern Ireland.

On March 31, 1932, the American Minister to Switzerland signed the convention on behalf of the United States, and on June 10, 1932, the United States Senate gave its advice and consent to the ratification by the President, who ratified the convention on June 17, 1932.

NORTH AMERICAN COUNCIL ON FISHERY INVESTIGATIONS

The eighteenth meeting of the council was held in Ottawa, Ontario, on September 29 and 30, 1931, with representatives from Canada, Newfoundland, and the United States present. The council approved the following resolution:

> The North American Council desires to express its appreciation of the invitation from the International Council, conveyed by its president, that the North American Council should be regularly represented at its annual meetings. The North American Council resolves that hereafter, when possible, a representative will attend the meetings of the International Council in alternate years and hopes that representatives of that body may similarly attend the meetings of the North American Council. Many important problems are common to the two organizations and call for conjoint discussion and cooperation which may be facilitated by such an interchange of representatives.

The council also resolved that in view of the primary influence of water conditions upon the course of the various fisheries, it is desirable that all information relating to temperature or other conditions be communicated immediately to some center for purposes of collation and prompt reissue in such bulletin form as may be decided upon, the Woods Hole Oceanographical Institute being suggested as the best available clearing house for such data; and the chairman, as director of that institution, being requested to consider the matter of provision of the requisite facilities.

Views were exchanged on the progress of investigations as follows: Fishery statistics; cod, haddock, and mackerel investigations; drift bottle and water temperature experiments; and bait investigations. The council has issued a publication summarizing its history and developments.

JAPANESE VESSELS IN BERING SEA

Crab-canning operations of a more or less experimental nature have been carried on by Japanese vessels in Bering Sea since 1930. In 1931 the floating cannery *Nagato Maru* spent approximately three months in the district, operating chiefly in the vicinity of Amak Island. This ship, with two auxiliary motor vessels, the *Kasuga Maru* and *Ise Maru*, returned in 1932 to engage in the packing of crabs in Bering Sea waters to the north of the Alaska Peninsula. In addition to the *Nagato Maru*, the trawler *Kokusai Maru* was in the Bering Sea region for several weeks in 1931 and made stops at a number of places in the Aleutian Islands, primarily in connection with a proposed good-will flight of Japanese aviators to this country.

DOMESTIC RELATIONS

FISHERIES OF THE VIRGIN ISLANDS AND PUERTO RICO

The Commissioner's report for last year referred to the investigations of the fisheries of the Virgin Islands and Puerto Rico, begun in May, 1931, which were completed in November. The islands are not self-supporting in regard to fishery products. For instance, while the Virgin Islands produced a little over 600,000 pounds of fishery products in 1930, during the same year they imported about an equal amount of fish, consisting largely of dry salt cod. The catch in 1930 in Puerto Rico amounted to over 3,000,000 pounds, and in the same year about 21,500,000 pounds of fishery products, consisting also largely of dry salt cod, were imported.

While the fisheries of these islands can not be expanded indefinitely, it is believed that they can be increased to a point where imports can be lowered to a minimum. A large variety of fish is found around the islands, and with present methods twice the present catch can undoubtedly be taken around the Virgin Islands and the catch of Puerto Rico also can be increased considerably. As the inhabitants of the islands undoubtedly could not consume the entire catch in a fresh state as taken, the bureau conducted studies toward developing methods for preserving the catch for future use. Two methods of accomplishing this appeared feasible: (1) Through the introduction of improved methods of handling and the use of ice and refrigeration; (2) by the development of a local fish-curing industry, thus providing a product to replace imported cured fish.

It was demonstrated that fresh fish products superior to any then marketed with a greatly extended period of preservation could be prepared, and a method was developed by which a dry-salt fish of good quality could be prepared. It was found possible to cure most of the larger food fish, barracuda being the most satisfactory. Small fish could be smoked satisfactorily, thus increasing the demand for these fish now in little demand. Inhabitants were instructed in the proper handling and refrigeration of fresh fish and in curing fish.

COOPERATION WITH THE STATES AND OTHER AGENCIES

Cooperation with other agencies was conducted on an unprecedented scale, greatly extending the bureau's sphere of usefulness with resultant economies in the cost of operation of the bureau and other governmental services.

In the field of biological investigations the Conservation Department of the State of New York is providing financial support for studies on nutrition of trout at Cortland, N. Y., in cooperation with the College of Agriculture, Cornell University; a limited amount for pond-culture work at Rochester, N. Y., where some 20 acres of ponds and lakes are already under cultivation; and a substantial sum toward the publication of a scientific paper dealing with life-history studies of the fishes of Lake Erie. Wisconsin and Michigan authorities have taken an active part in studies of the destruction of immature fish by fishing gear in Lake Michigan, contributing funds for the operation of the bureau's vessel *Fulmar*. Louisiana and Texas have contributed personnel and other assistance in furthering the shrimp investigations. California is meeting half the costs of investigations of trout and oysters. North and South Carolina, Georgia, and Florida have contributed to the oyster cultural research program in that area. Connecticut authorities have made available a field laboratory and the State shell-fisheries research vessel for oyster investigations in the Long Island Sound area. A field laboratory for oyster research in Puget Sound, near Olympia, is also being provided by the State of Washington.

More than 15 States have cooperated with the bureau in fish-cultural work. This aid includes the joint operation of hatcheries, aid in collection of eggs, and exchange or transfer of eggs to meet demands which could not otherwise be fulfilled. In the Rocky Mountain section a program of investigation of waters in the national forests has been developed to formulate an adequate stocking and rearing policy along scientific lines. Similar investigations are being conducted in the Yellowstone, Teton, and Glacier National Parks. The Bureau of Indian Affairs has aided in the collection of trout eggs on the Pyramid Lake Reservation. In cooperation with the Bureau of Reclamation attempts are being made to develop a program for the protection of fisheries which may be affected by irrigation and reclamation projects under Federal control. As a basic industry the fisheries should be accorded proper consideration and treatment. Reference is made elsewhere to the extensive cooperation with private sportsmen's organizations in the rearing of fish to fingerling or adult size for stocking purposes.

The Pacific and Great Lakes States have been particularly helpful in the collection of fishery statistics. More recently Maryland and Virginia have installed more complete systems for the collection of such data. Last year many of the States in the Mississippi River section contributed personnel to aid in the canvass of that area. In this as in many of its activities the bureau represents the correlating agency, performing necessary service beyond the scope of the individual States.

The bureau's technological program has been materially broadened by cooperation with other agencies. At the South Carolina Food Research Commission one of its investigators is studying the anti-anæmic properties of oysters in collaboration with investigators at that institution. The bureau is also cooperating with the Ohio State Agricultural Experiment Station, Wooster, Ohio, and the North Carolina State Agricultural Experiment Station, Raleigh, N. C., in the feeding of fishery products to farm animals. In cooperation with the United States Department of Agriculture and producers of kelp meal, nutritive studies of kelp meal are in progress. At Gloucester, Mass., local fishing interests are making material contributions to the maintenance of the bureau's technological laboratory located in that city in providing laboratory space without cost to the Government.

In Alaska during the past calendar year the bureau transported more than 50 employees of other Government agencies on its vessels and in many other ways it has rendered service to Federal and Territorial representatives in that section.

FIVE-YEAR CONSTRUCTION PROGRAM

Under the authorization of the act of May 21, 1930 (46 Stat. 371), appropriations for augmenting of the bureau's fish-cultural facilities in the amount of $448,500 were made available for the continuation of projects previously initiated and for the inception of several new ones. There were placed in operation during the year the new experimental hatchery in West Virginia and a sorely needed bass hatchery in New Mexico. The establishment at Natchitoches, La., was largely completed but not placed in operation. Development work at a substation near Leadville, Colo., and a hatchery in central

Tennessee were pushed during the year and carried well on toward completion. At the close of the year construction at Lake Mills, Wis., and in the Madison Valley, Mont., was just being started, and a site had been acquired in Idaho for a large trout hatchery. In addition, a hatchery in southwestern Oregon was under construction. Negotiations for the purchase of a location at Cortland, N. Y., were not fully completed at the close of the year, as was the case at the Mill Creek (Calif.) station now operated under a lease. Preliminary development of a bass hatchery on a newly acquired site in Alabama was also started. Sites in Indiana and Pennsylvania have been acquired, but as no funds were appropriated for the continuation of the construction program in 1933, no further developments will be possible. A location for a substation in Texas was selected and will be acquired, although this project likewise lacks appropriations for construction. As an auxiliary to the propagation of salmon in the Puget Sound region, there is being constructed a game-fish hatchery adjoining Mount Rainier National Park to be devoted exclusively to the stocking of the park and surrounding waters.

BUREAU'S NEW HEADQUARTERS

After more than 50 years of occupancy of the old Armory Building at Sixth and B Streets SW., on January 1, 1932, the bureau moved into its quarters in the new Commerce Building between Fourteenth and Fifteenth Streets, south of Pennsylvania Avenue. Its new quarters include limited laboratory facilities for research in various fields of fisheries, biology, and technology, and an attractive aquarium in the basement of 47 tanks and 3 floor pools with a capacity several times that afforded in its former quarters.

ALASKA FISHERIES SERVICE

ADMINISTRATION OF FISHERY LAWS AND REGULATIONS

An effective policy for the conservation of the fisheries of Alaska has been continued under the White law of June 6, 1924, which gives the Secretary of Commerce plenary power to regulate commercial fishing. Close attention was given to the study of the salmon for the purpose of regulating fishery operations to assure an ample escapement of brood fish for maintaining the runs without impairment. The Commissioner of Fisheries was in Alaska for several weeks during the active fishing season giving personal attention to this matter.

A generally normal run of salmon occurred in Alaska in 1931, but there was marked voluntary curtailment of fishery operations because of economic conditions.

Revised regulations for the protection of the fisheries of Alaska were approved by the Secretary of Commerce on December 17, 1931, and became effective January 1, 1932. The generally satisfactory condition of the fisheries made unnecessary any drastic modification of the regulations.

In protecting and conserving the Alaska fisheries, an effective patrol of the fishing grounds to prevent violations of the regulations was maintained. In addition to 12 statutory employees and the 53 persons on the bureau's fleet of 15 vessels, 220 men were employed as stream guards and special workmen in 1931. In addition, 9 chartered vessels were used, and there was also limited aerial patrol service.

The work of maintaining the salmon runs at the maximum productivity was aided materially by the removal of obstructions hindering the free passage of salmon to the spawning grounds and by the destruction of predatory enemies. The latter work was carried on in cooperation with the Territory, chiefly in the Bristol Bay region, and has proved to be not only of great value to the salmon fishery but also has provided an important source of income for local residents.

ALASKA SALMON HATCHERIES

At the Government hatcheries at Afognak and on McDonald Lake 48,055,000 red-salmon eggs, 353,000 pink-salmon eggs, 33,000 steelhead-trout eggs, and 2,731,000 Dolly Varden trout eggs were collected in 1931. The Dolly Varden trout eggs and 3,145,000 red-salmon eggs in the eyed stage were shipped to Seattle for distribution. One privately owned hatchery, operated under the provisions of the Alaska fisheries act of June 26, 1906, collected 20,280,000 red-salmon eggs.

PRODUCTS OF THE FISHERIES

The yield of the Alaska fisheries in 1931, curtailed considerably because of economic conditions, showed a decrease of approximately 7 per cent in quantity and 11 per cent in value, as compared with figures for the preceding year. The decline occurred chiefly in herring and halibut products and in the total suspension of whaling operations.

Salmon products comprised about 79 per cent in quantity and 91 per cent in value of the total output of the Alaska fisheries in 1931. Nearly 95 per cent of the salmon production consisted of canned salmon, the pack amounting to 5,403,739 cases, or 259,379,472 pounds, valued at $29,096,292. As compared with the pack of the preceding year, the output of canned salmon in 1931 showed an increase of 7 per cent in quantity but a decrease of 2 per cent in value. The number of canneries operated dropped from 149 in 1930 to 116 in 1931.

The total output of Alaska fisheries products in 1931 was 345,435,388 pounds, valued at $33,594,752, as compared with an average of 377,905,159 pounds, valued at $47,570,728, for the 5-year period from 1926 to 1930, inclusive. The value of the 1931 catch to the fishermen was approximately $10,043,000, or about $2,242,000 less than in the preceding year. There were 22,577 persons employed in the various branches of the industry, as against 27,568 in 1930.

ALASKA FUR-SEAL SERVICE

GENERAL ACTIVITIES

Under international cooperation secured by the North Pacific Sealing Convention of July 7, 1911, whereby the killing of fur seals on the high seas of the North Pacific is prohibited, the fur-seal herd which has its breeding grounds on the Pribilof Islands in Bering Sea has changed from a state of threatened extinction to a well-developed economic resource. During the 21 years in which the treaty has been in effect the herd has steadily increased, and about 50,000 surplus 3-year-old male seals are now taken annually.

Progress was made in the construction program, particularly regarding facilities for the handling of increased takes of sealskins. On St. Paul Island work was continued on the East Landing wharf, a garage for trucks and other motive equipment was built, a new pump house was erected and equipment installed to provide an additional water supply for the washing of sealskins, and the construction of a new Government house and a community hall was begun. Some extension of improved roads was accomplished on both islands.

Through cooperation of the Navy Department the annual supplies for the Pribilof Islands were transported from Seattle, Wash., on the U. S. S. *Vega*, and the season's take of sealskins was brought to Seattle by that vessel. Valuable assistance was rendered also by the United States Coast Guard in patrolling waters frequented by the fur seals and in performing other services in connection with the bureau's administration of affairs at the islands.

The Commissioner of Fisheries visited the Probilof Islands in July to observe the progress of sealing activities.

SEAL HERD

The computed number of animals in the Pribilof Islands fur-seal herd on August 10, 1931, was 1,127,082, an increase of 81,981, or 7.84 per cent, over the corresponding figure for 1930.

TAKE OF SEALSKINS

In the calendar year 1931 there were taken on the Pribilof Islands 49,524 fur-seal skins, of which 39,964 were from St. Paul Island and 9,560 from St. George Island. This was an increase of 7,024 over the number taken in 1930.

MARKING RESERVED SEALS

In 1931 there were marked and reserved for future breeding stock 5,226 3-year-old male seals, of which 3,570 were on St. Paul Island and 1,656 on St. George Island. The reserve includes also a large number of seals of this age class that were not taken in the drives.

SALE OF SEALSKINS

Three public auction sales of fur-seal skins taken on the Pribilof Islands were held in the fiscal year 1932, the first two being at St. Louis, Mo., and the third at New York City. On August 24, 1931, there were sold 9,125 black-dyed and 6,000 logwood brown-dyed skins at a gross price of $282,642.75.

The sale on October 19, 1931, consisted of 5,535 black-dyed and 3,980 logwood brown-dyed skins, which brought a total of $153,938.50. At the same time there were sold 32 confiscated fur-seal skins, raw, for $15.25, and 2 confiscated sea-otter skins for $430.

At the sale on June 13, 1932, 3,788 black-dyed and 3,448 brown-dyed skins brought $102,328.05. A number of skins were withdrawn from the sale.

Special sales of sealskins authorized by the Secretary of Commerce in the fiscal year 1932 consisted of 150 black-dyed, 150 brown-dyed, and 5 exhibition skins, which sold for a gross price of $7,309.90. All were taken at the Pribilof Islands. These special sales included 150 skins that were sent to Paris and manufactured into 19 coats, which were returned to this country and used for advertising purposes.

FOXES

The management of herds of blue foxes on St. Paul and St. George Islands provides employment for the natives when sealing activities are at a minimum and is a source of additional revenue to the Government.

The 889 blue and 26 white fox skins taken in the 1930–31 season were sold at public auction in the fiscal year 1932. The blue pelts brought $19,559.50 and the whites $466, a total of $20,025.50.

In the season of 1931–32, 289 blue and 25 white fox skins were taken on St. Paul Island and 1,112 blue fox skins on St. George Island, a total of 1,426 skins. Of the blue foxes that were trapped, 37 on St. Paul Island and 432 on St. George Island were marked and released for breeding purposes.

FUR-SEAL SKINS TAKEN BY NATIVES

The North Pacific Sealing Convention of 1911 provides that aborigines of the Pacific coast may, under certain restrictions, take fur seals at sea. Before the skins of such animals may enter into commerce they must be authenticated as having been lawfully taken. In 1931 there were authenticated by officials of the respective Governments 1,649 fur-seal skins, of which 21 were taken by natives of southeast Alaska, 165 by natives of Washington, and 1,463 by natives of British Columbia.

FUR-SEAL PATROL

A patrol for the protection of the fur-seal herd was maintained by vessels of the United States Coast Guard. Two vessels of the Bureau of Fisheries participated in this work in the spring, the *Widgeon* in southeast Alaska and the *Brant* off the coast of Washington.

PROTECTION OF SEA OTTERS, WALRUSES, AND SEA LIONS

Revised regulations for the protection of walruses and sea lions were issued as of May 1, 1932, extending the closed season on these animals for another 2-year period, while permitting, as heretofore, certain limited killing under specified conditions. The killing of sea otters is prohibited at all times.

PROPAGATION AND DISTRIBUTION OF FOOD AND GAME FISHES

The hatchery organization operated under the supervision of the division of fish culture of the bureau was responsible for the distribution of 7,073,935,200 fish and eggs during the fiscal year. This represents a moderate decrease from the output of the previous year when 7,121,806,000 fish and eggs were produced. Part of the decline is chargeable to a marked reduction in the number of fish handled in the rescue work on the upper Mississippi River area. A survey of the more than 45 individual species handled indicates that certain well-defined groups suffered a slight reduction in addition to the category mentioned above. Practically all of the Pacific salmons were handled in smaller numbers. Important commercial fishes of the Great Lakes, specifically, the whitefish, cisco, and lake trout, also showed a decline in production. A large number of trout was distributed, and in the group of marine fishes the cod and haddock showed an increase, while the pollock and winter flounder, which normally represent over half of the total output, declined by approximately one-half billion. Analysis further shows that the production of fingerling fish, which represents those forms which have attained a size ranging from several inches up to the legal length, was also quite sharply curtailed, with an output of 148,000,000 as compared with 320,000,000 for the previous fiscal year. This is to a large extent accounted for, however, by the decline of 120,000,000 in the class of rescued fishes which normally represents a large proportion of the fingerling output. It should be further pointed out that in the majority of instances where a decline occurred the eggs are secured from commercial fisheries and are not produced at the hatcheries as is the case with trouts and other game varieties. Therefore, the collection of eggs and the consequent output of fish is largely controlled by conditions which the bureau can not modify, particularly weather and market conditions, and it is not unusual for considerable fluctuations in the output of the commercial species to occur from year to year.

There follows analysis of the total production broken down to show the output by certain species and groups classified according to their relationships:

	Number
Game fishes:	
Warm-water species—	
Basses	4, 685, 000
Sunfish	10, 357, 200
Crappie	6, 951, 000
Pike and pickerel	59, 000
Catfish	12, 185, 000
White perch	7, 000, 300
White bass	16, 700
Other	542, 300
Total	41, 796, 500
Cold-water species—	
Trouts—	
Brook	17, 898, 000
Rainbow	13, 953, 000
Loch Leven	23, 143, 000
Black-spotted	17, 178, 000
Golden	50, 100
Dolly Varden	2, 462, 000
Grayling	41, 100
Landlocked salmon	986, 700
Total	75, 711, 900
Commercial fishes:	
Anadromous species—	
Shad	29, 758, 000
Glut herring	55, 000, 000
Striped bass	1, 676, 000
Salmon:	
Atlantic	1, 143, 700
Pacific	134, 774, 100
Total	222, 351, 800
Interior waters (including Great Lakes) species—	
Whitefish	69, 880, 000
Cisco	23, 000, 000
Lake trout	25, 630, 300
Pike perch	401, 604, 000
Yellow perch	182, 276, 700
Carp	247, 421, 000
Buffalofish	255, 856, 000
Total	1, 205, 668, 000
Marine species—	
Cod	1, 628, 766, 000
Haddock	800, 151, 000
Pollock	14, 670, 000
Winter flounder	3, 049, 124, 000
Mackerel	15, 245, 000
Total	5, 507, 956, 000
Miscellaneous fishes	20, 451, 000
Grand total	7, 073, 935, 200

PROPAGATION OF COMMERCIAL SPECIES

Marine species of the Atlantic coast.—While haddock and cod were handled in larger numbers, a very poor market for pollock materially curtailed the output of this species from the Gloucester (Mass.) station. Furthermore, a decline of approximately 500,000,000 fry of the winter flounder was registered in the operations of the Boothbay Harbor (Me.) and Woods Hole (Mass.) stations.

Pacific salmon.—With the exception of the chum salmon and the steelhead salmon, the output of all the varieties of commercial Pacific salmons registered a decline. Propagation of these forms is especially dependent upon the abundance of the run of fish, and since these runs fluctuate according to year classes, the hatchery production is likewise variable.

Anadromous species of the Atlantic coast.—Included in this group are certain commercial forms comprising the shad, striped bass, Atlantic salmon, and glut herring. The shad work is chiefly centered on the Potomac River, and in this field a considerable increase in output was achieved. The propagation of striped bass in cooperation with the State of North Carolina did not yield results of any great importance during 1932. The propagation of Atlantic salmon is dependent upon the quantity of eggs which may be obtained from the Canadian Government, since they are not readily available in the United States. A noticeable reduction in the egg supply was, of course, reflected in a curtailed output of the fingerling salmon.

Commercial species of interior waters.—While the most important groups in this field comprise the whitefish, lake trout, cisco, and pike perch of the Great Lakes, the buffalofish and carp are handled to a considerable extent, the work being chiefly confined to the fertilization and planting of the eggs on the normal spawning grounds rather than any incubation in the hatcheries. The number of eggs of the two latter varieties handled was materially increased, but in the case of the Great Lakes species, with the exception of the pike perch, results were disappointing. The unusually mild weather extending into the early winter greatly retarded the spawning and rendered such eggs as were secured of rather poor quality. The work on Lake Ontario carried on from the Cape Vincent (N. Y.) station suffered most materially from these conditions. However, during the spring months there was a phenomenal run of pike perch which resulted in a stock of eggs to the full capacity of not only the bureau's hatcheries but all the State hatcheries handling this variety.

PROPAGATION OF GAME FISHES

While a considerable number of game fishes are handled in rescue operations, the majority of these species are produced at the bureau's own hatcheries, limited only by the space and funds available, and it is therefore possible to exercise much greater control over the output. As a result of this, almost all of the most important forms, including the trouts, landlocked salmon, and the largemouth and smallmouth bass were distributed in greater numbers to keep pace with an increase in the number of applications which are reaching new high totals each year. Since only two new hatcheries were actually placed in operation during the year, the increase is largely attributable to more efficient methods and in few instances to more favorable weather and water conditions.

In connection with this work there is carried on a cooperative rearing pond system under which sportsmen's organizations receive fish from Federal hatcheries and retain them for feeding and rearing in ponds or, in several instances, complete hatchery units owned, developed, and maintained by the cooperating organization. Apparently economic conditions curtailed the funds which sportsmen could spend for this work and a smaller number of organizations to which a smaller number of fish were allotted cooperated with the bureau during the fiscal year 1932.

RESCUE OPERATIONS

The salvage of fishes stranded in the overflowed areas of the upper Mississippi River, principally in the Upper Mississippi Wild Life and Fish Refuge, was conducted on a much restricted basis during 1932. This was because water conditions rendered salvage work impracticable or unnecessary to a considerable degree, with the result that the collections of 51,611,367 represent less than one-third of the figures for the previous record year.

STATISTICAL SURVEYS

FISHERIES OF THE UNITED STATES, 1930

New England States.—During 1930 the fisheries of Maine, New Hampshire, Massachusetts, Connecticut, and Rhode Island employed 17,077 fishermen, or a decrease of less than one-half of 1 per cent under 1929. The catch amounted to 701,350,979 pounds, valued at $27,493,479—an increase of 1 per cent in the catch, but a decrease of 5 per cent in value as compared with 1929. Landings of fish by American vessels at Boston and Gloucester, Mass., and Portland, Me., amounted to 350,801,470 pounds as landed, valued at $12,785,452—an increase of 7 per cent in volume over 1929.

Middle Atlantic States.—During 1930 the fisheries of New York, New Jersey, Pennsylvania, and Delaware employed 10,605 fishermen, or 1 per cent more than in 1929. The catch amounted to 193,867,981 pounds, valued at $13,063,672—an increase of 2 per cent in the catch, but a decrease of 8 per cent in its value as compared with 1929. Landings of fish at New York City and Groton, Conn., amounted to 57,255,000 pounds, or 24 per cent less than in 1929. On the Hudson River the shad fishery was carried on by 243 fishermen who caught 206,504 pounds of shad, valued at $33,372—a slight increase over 1929.

Chesapeake Bay States.—In the calendar year 1930 the fisheries of Maryland and Virginia employed 19,391 fishermen, or 5 per cent more than in 1929. The catch amounted to 316,392,924 pounds, valued at $11,472,050—an increase of 15 per cent in the catch, but a decrease of 1 per cent in its value as compared with the previous year. The shad and alewife fisheries of the Potomac River were prosecuted by 608 fishermen, who caught 601,193 pounds of shad, valued at $98,041, and 3,114,918 pounds of alewives, valued at $49,315.

South Atlantic and Gulf States.—During 1930 the fisheries of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas employed 23,590 fishermen, or 11 per cent less than in the previous year. The catch amounted to 417,759,466 pounds, valued at $11,064,819—a decrease of 22 per cent in the catch and 26 per cent in its value as compared with 1929.

Pacific Coast States.—In the calendar year 1930 the fisheries of Washington, Oregon, and California employed 19,574 fishermen or 2 per cent less than in 1929. The catch amounted to 833,388,643 pounds, valued at $23,064,140—a decrease of 19 per cent in the catch and 8 per cent in its value as compared with 1929. The total catch of halibut by United States and Canadian vessels amounted to 49,408,000 pounds, valued at $4,974,000—a decrease of 11 per cent in quantity and 26 per cent in value as compared with 1929.

Lake States.—During 1930 the lake fisheries (Lakes Ontario, Erie, Huron, Michigan, Superior, and Namakan and Lake of the Woods and Rainy Lake) of the United States and Canada produced 121,532,395 pounds of fish and shellfish. Of the total, the United States accounted for 94,947,642 pounds, valued at $6,050,267. There was an increase in the catch, but a decrease in its value as compared with that in the previous year.

Mississippi River and tributaries.—During the calendar year 1930 the catch of fresh-water mussel shells amounted to 59,490,000 pounds, valued at $1,092,156—an increase of 9 per cent in the quantity and a decrease of 18 per cent in the value as compared with 1929. The fisheries of Lakes Pepin and Keokuk decreased as compared with 1929.

MANUFACTURED PRODUCTS IN THE UNITED STATES AND ALASKA, 1930

The total value of manufactured fishery products in the United States and Alaska in 1930 amounted to about $170,000,000. This includes cured products and by-products manufactured in the States of the Mississippi Valley which are not included in the following discussions of groups of products.

Fresh and frozen packaged products.—The production of fresh and frozen packaged fish and shellfish in 1930 amounted to 157,378,368 pounds, valued at $28,996,454. The most important items were fresh-shucked oysters, amounting to 5,502,723 gallons, valued at $10,346,848, and fresh and frozen haddock fillets, amounting to 63,701,659 pounds, valued at $9,997,855.

Cured products.—During 1930 the output of cured fishery products (salted, spiced, smoked, and dried) amounted to 124,496,656 pounds, valued at $16,837,406—an increase of 2 per cent in amount, but a decrease of 10 per cent in value as compared with 1929. Important products were mild-cured salmon, 10,157,175 pounds, valued at $2,065,553 and salted cod, 18,571,452 pounds, valued at $1,464,774.

Canned products.—Canned fishery products produced during 1930 amounted to 577,782,585 pounds, valued at $83,015,055, or a decrease of 18 per cent in the value as compared with 1929. Canned salmon amounting to 6,086,479 standard cases (292,150,992 pounds), valued at $42,828,172, was most important. Other important products were sardines, tuna and tunalike fishes, shrimp, clam products, and oysters.

By-products.—During 1930 the production of fishery by-products in the marine and lakes sections amounted to $19,559,856. There was a considerable decrease compared with 1929. Important products in this group were marine-animal meals and scrap, pearl and oyster-shell products, and marine-animal oils.

Frozen products.—The pack of frozen fishery products in 1930 amounted to 139,297,000 pounds, which had an estimated value of $16,500,000. The volume of the pack was 15 per cent greater than in 1929. The more important products in the group with respect to volume were haddock fillets, 19,270,819 pounds; salmon, 15,991,896 pounds; and halibut, 13,588,630 pounds.

SOME UNUSUAL MARKETS FOR FISH AND SHELLFISH

In an effort to expand the consumption of fishery products, the bureau surveyed and reported upon several unusual outlets for these products. This included the newly established commercial sport-fishing industry which numbers more than 40 firms in the country with an investment in excess of $500,000 and the development of a hot-fish shops industry.

TECHNOLOGICAL INVESTIGATIONS

NUTRITIVE VALUE OF MARINE PRODUCTS

In cooperation with and in the laboratories of the Bureau of Chemistry and Soils, the bureau's technologists completed an investigation in which it was shown that commercially produced burbot-liver oils were from four to ten times as potent in vitamin A and from three to four times as potent in vitamin D as medicinal cod-liver oil. It also was shown that burbot-liver oil meets the United States Pharmaceutical X requirements for cod-liver oil with respect to specific gravity, iodine number, acid value, and unsaponifiable matter. This work should be of value in promoting a burbot-liver oil industry on the Great Lakes and thereby find a market for a by-product from a fish little used, but which can be taken in larger quantities than at present.

As a result of experiments conducted by the bureau in cooperation with a producer of kelp meal, it has been found that kelp meal is a valuable supplement to corn gluten meal, cottonseed meal, and linseed oil meal in the rations of animals. Kelp meal is also a good source of vitamin A, containing about one-fourth as much as alfalfa hay, approximately the same amount as fresh eggs, and one and one-half times as much of this vitamin as yellow corn. Further experiments showed that kelp meal stimulates appetite, and therefore is an important factor in increasing both growth and food consumption, thus shortening the period of production of animals for early market maturity.

Studies by this bureau, in cooperation with the Bureau of Chemistry and Soils, have revealed that fish flour, produced from edible filleting waste, is an extremely valuable source of minerals, such as calcium and phosphorus, particularly for growing children, and that fish flour can be incorporated in bakery products, making a palatable and nutritious food.

PRESERVATION OF FISHERY PRODUCTS FOR FOOD

Studies on the preservation of fishery products for food are being directed toward developing standard simplified chemical methods for determining the condition of the flesh of fish as to freshness, age, or stage of decomposition. In addition, efforts are being devoted to establishing a standard procedure for smoking fish whereby a product of uniformly high quality can be prepared. For the latter purpose an experimental smokehouse, which is capable of controlling temperature, humidity, volume of smoke, and other variable factors encountered in smoking fish, has been built by the technologists of this bureau. Laboratory tests of smoking fish in this apparatus have shown that a product of uniform high quality can be prepared.

BACTERIOLOGY OF FISH PRESERVATION

Bacteria play an important rôle in the handling, preservation, and storage of fishery products. In order to learn the effect of this rôle on commercial practice and also to aid with other technological research, the bureau during the past year installed a bacteriological unit in its Gloucester laboratory. Research to date has consisted in determining the germicidal effect of smoke on fish, the nature of molds on smoked fish and their prevention, and the bacteriology of fresh and frozen fish.

PRESERVATION OF FISHERY BY-PRODUCTS

With the installation of a by-products unit as a part of the technological laboratory at Gloucester, Mass., four by-products investigations of pressing interest to the fishing industry were inaugurated.

Studies on improved methods of manufacturing fish meal from nonoily fish waste have indicated that high temperatures or lengthy drying periods are detrimental to the finished product. Inasmuch as elimination of one ordinarily results in the increase of the other, a distinct advantage may be expected from the determination of an optimum condition.

The problems associated with the manufacture of fish flour from fillet waste are similar to those associated with the fish-meal work, except that more refined methods are permissible and must be applied in preparing a product for human consumption. One of the main problems in this connection is to obtain an extremely rapid removal of moisture at low temperature. The initial work on this problem, therefore, has been the development of an apparatus which will disperse fish material in a drying medium so that extremely rapid drying can be effected.

Studies on haddock-liver oils have shown that this oil varies in its natural chemical, physical, and biological properties according to season and habitat of the fish.

Studies on improving the technical usefulness of fish oils are expected to point out when fish oils, owing to their natural variation, are most nearly fitted for the many uses which can be made of them.

NET PRESERVATION

As a result of continued research on net preservation and field observation in many varied commercial waters, it has been found that the life of twine used in heavy gear, such as traps and seines, can be materially extended by applying toxic dyes to the cotton before the twine is made, followed by the proper application to the finished net of coal tar, prepared within test limits developed by this bureau. Several concerns are now prepared to furnish special dyed twine and also specification tar as recommended by the bureau.

For the preservation of light gear, such as gill nets, thorough cleansing of the net is of the most importance in extending its life, while storage by suspension in dry shade is of secondary importance. Chemical preservatives are apparently of minor value.

BIOLOGICAL FISHERY INVESTIGATIONS

Although the biological researches of the scientific staff of the division of inquiry respecting food fishes are often regarded as having primary value to conservation as a basis for the regulation or prevention of overfishing by State legislation, they have equal value to the Nation through encouraging the wise use of our aquatic resources. They offer direct aid to industry by providing exact information regarding the source of supply for the commercial fisheries and in some cases predict years of unusual abundance or scarcity; they aid the water farmer by devising and demonstrating improved methods of fish and shellfish culture. These investigations are organized under responsible heads in each of the major geographical areas of the United States where local field headquarters or laboratories are maintained, in many cases in space provided by universities. The problems of the fisheries of the Nation are therefore considered as units.

FISHERIES OF THE ATLANTIC AND GULF COASTS

Investigations on the changing abundance of the important food fishes of the Atlantic coast have been expanded during the past year by the development of the studies of the haddock supply initiated during 1930. This fishery has experienced a serious decline in yield per unit of effort during the past few years following a period of exceptional production. On the fishing grounds, principally Georges Bank and South Channel, where the bulk of the United States landings have originated, the abundance of haddock increased markedly from 1924 to a maximum in 1927. Since then the supply has fallen off sharply to a level in 1930 far below that in 1924 and has continued to decline during 1931.

By combining with the statistical analysis of the yield per unit of effort a study of the biology of the haddock stock, primarily size and age composition, growth rate, and distribution, it appears that an extraordinarily successful natural production of haddock occurred between 1920 and 1922. In 1925 the full effect of these abundant year groups was reflected in increased landings of scrod sizes, which in the following two years had grown sufficiently to be included as large haddock resulting in a continuing increase in abundance until the peak was reached in 1927. Since that year the catch statistics do not indicate the production of any year class at all comparable to those of the earlier period.

Work carried on during the past year both at sea and on shore has shown that there is now present on the banks a group of small haddock forming the most numerous year class which has appeared during the past several years. It is anticipated that as this abundant group grows in size the landings of scrod will increase and during 1932 and 1933 a proportional increase in the landings of large haddock should occur. With favorable market conditions therefore the outlook for a more successful haddock fishery is bright.

A continued study of fluctuations in the mackerel fishery is also producing results that should be of great value to the industry. By studying the condition and trend of this fishery, which yielded 64,000,000 pounds in 1929, it is possible not only to discover depletion, should it occur, before it becomes disastrous to the industry but also to issue predictions of future yields which permit an adjustment of distributing facilities and expenditures for production and prevent to some extent the demoralizing effects of glutted markets. As a result of such studies a prediction was issued in May at the beginning of the mackerel season which estimated the quantities of mackerel in the sea to be sufficient to yield 26,000,000 pounds of commercial size exclusive of 1931 tinkers, providing the same number of vessels operated with the same intensity of fishing as during the last year. The prediction of the previous year of 35,300,000 pounds exclusive of 1930 tinkers was surprisingly close. The actual yield of the sizes of fish considered was 32,164,000 pounds, while the total catch for the season was approximately 36,472,000 pounds.

In order to provide a more complete understanding of the causes of fluctuations in abundance, observations on the spawning grounds from Cape Cod to North Carolina were continued. Oceanographic observations were made on ocean drifts, on the abundance of eggs and larvæ of the mackerel, and experimental studies on the rate of development of mackerel eggs under varying conditions of temperature were carried out.

Limited observations on the migrations of the cod by means of tagging experiments confirmed and extended previously published conclusions. Similar studies were also conducted on the important shore fishes of the Middle Atlantic States, including the squeteague or weakfish, scup, butterfish, sea bass, and summer flounder. The relationship of production areas from Chesapeake Bay northward has been demonstrated and variations in the supply of these important fishes are now believed to follow the same principle of dominant year classes demonstrated for the haddock and mackerel. During the past two years commercial trawlers have located and are exploiting these species on their winter feeding grounds off the Virginia capes. A study of the migrations and varying abundance of these species is being extended to include the offshore areas in order to determine what the probable effect will be of the winter drain upon the supply which heretofore has been exploited only in the summer seasons.

Investigations of fishery problems in the South Atlantic and Gulf include the shrimp fishery from North Carolina to Texas, oyster culture in the coastal area from North Carolina to Florida, and ichthyological studies of the fish fauna of the Gulf coast. The biological problems presented by the shrimp, which is supporting a rapidly growing commercial fishery of vast proportion, are proving particularly difficult of solution. The bureau's investigators are, nevertheless, making progress in understanding the life history of the three important species of shrimp. Although it would be premature even to outline the life history of these species, there can be little doubt that the life span is short and that most of the fishery draws upon dangerously young or spawning individuals. Under these circumstances depletion, should it appear, may run a tragically rapid course, a condition which emphasizes the importance of providing reasonable protection to this valuable animal.

With a change of personnel at the Fisheries Biological Laboratory, Beaufort, N. C., emphasis has been placed upon studies in shellfish culture in the Southern States. Experimental oyster beds have been established at various points from North Carolina to Florida where the improved methods of culture developed in northern waters will be adapted to local conditions. Physiological studies of narcosis conducted at the laboratory give promise of leading to improved and simplified commercial methods of shucking oysters that will effect economies in operation and improve the product.

FISHERIES OF INTERIOR LAKES

Major field investigations in the Great Lakes area during the past year were conducted on Lakes Michigan and Huron, while minor operations were carried on in Lake Erie and also in Lake Champlain. The primary objective of the Lake Michigan work was a study of the chub nets in order to determine their selectivity with regard to chubs and their destructiveness to immature lake trout. A similar investigation was conducted in the northern part of Lake Michigan, in Green Bay, and Lake Huron regarding the destructive action of deep crib nets, a form of gear recently introduced into these waters and which apparently is very destructive to immature fish. A study of the destructiveness of gill nets and trap nets in Lake Erie was completed during the past fiscal year, and reports are now in preparation. Limnological studies conducted during the previous year with the cooperation of the State of Ohio are also progressing. Pollution was demonstrated at the mouths of important rivers, but the extent of conditions detrimental to fish resulting from such pollution was less than had been anticipated.

In the Wisconsin lakes detailed studies of the rate of growth of various food and game fishes have been continued, and work is now progressing in the analysis and correlation of a large number of data collected by the bureau and by the Wisconsin Biological and Natural History Survey.

FISHERIES OF THE PACIFIC COAST AND ALASKA

In order to properly safeguard the salmon fishery resources of Alaska and to comply with the White Act of 1924, it is essential that a knowledge of the routes of migration of the important salmon runs and an enumeration of the spawning fish passing weirs on their way to headwater streams for propagation and the age composition of the various runs be available. The bureau's investigators continued biological observations on these subjects and on the red salmon in Bristol Bay and the Karluk, Chignik, and Copper Rivers in Alaska. A similar investigation was carried on with respect to the pink salmon in southeastern Alaska. An additional section of the analysis of the statistics of the Alaska salmon fisheries covering the Prince William Sound area and the Copper and Bering Rivers has been submitted for publication.

Further knowledge of the life history of the Alaska herring demonstrates the racial segregation of the stock and points out the causes of fluctuations in abundance from year to year. Again the principal of dominant year classes apply as in other fisheries and indicate the importance of protecting the supply during periods when natural reproduction falls below normal.

During 1931 an investigation of the sockeye salmon fishery in Puget Sound was undertaken to study the annual changes in abundance of the runs as shown by statistics of the past seasons and to identify distinct races taking part in these runs, if such exist, so that protection may be given to the elements of population that apparently are suffering depletion. Such information will be of great value in protecting the fishery in the event that the international treaty under consideration is finally ratified.

FISH-SCREEN AND FISH-LADDER INVESTIGATIONS

After extensive trials with various types of fish screens, including the electric, the bureau's investigators have concluded that in order to protect downstream migrating salmon and other fishes from destruction in irrigation projects the revolving mechanical screen is preferable. Under some circumstances success has been had with the electric screen; but public opinion frequently is opposed to its use, and no large-scale program of future installation of this type is contemplated. The bureau has cooperated with the States of Washington, Idaho, and Maine in preparing designs and advice for the installation of improved types of fish ladders on various large-scale hydroelectric or irrigation projects.

AQUICULTURAL INVESTIGATIONS

A considerable amount of attention is given to problems of interest to the angler, inasmuch as they concern the food and game fishes of interior fresh waters and their culture, distribution, and planting in depleted or formerly barren areas. Facilities for investigations in the interest of fish culture were materially increased during the year by the construction of a new experimental hatchery at Leetown, W. Va. At this station facilities have been provided for detailed laboratory studies on the nutrition of fish and on fish diseases. The hatchery troughs were stocked fully with rainbow, brook, and brown trout eggs and at the close of the year were filled with vigorous and rapidly growing fingerlings. Although funds did not permit the full development of the station, a bass pond was constructed and outdoor pools of circular type are being tested on a considerable scale and are found to be particularly successful for the rearing of trout.

Additional large-scale feeding experiments and work on the selective breeding of superior stocks of trout have continued at the Pittsford (Vt.) experimental hatchery, and excellent results have been obtained in studies of sanitation and disease control and treatment. Cooperative trout and bass cultural studies were also undertaken at the Hackettstown (N. J.) station.

Large-scale pond cultural experiments have been continued at the Fairport (Iowa) laboratory, where pond fertilization and forage fish culture have been adopted as routine practice in growing black bass. Similar studies have been undertaken at the Tishomingo (Okla.) station to adapt successful methods to the special conditions of pond culture in Southern States. An investigation of fish culture in the sloughs of the Upper Mississippi Wild Life and Fish Refuge was completed, demonstrating only limited possibilities in this area because of extreme variations in river level.

FISHERY STUDIES IN NATIONAL PARKS AND FORESTS

Recognizing the responsibility of the Federal Government of maintaining the supply of fish as well as other wild life in the public domain, arrangements were made with the Forest and Park Services to develop a large-scale program of stocking lakes and streams, particularly in the intermountain area.

SHELLFISHERY INVESTIGATIONS

Two distinct lines of investigations regarding shellfish and shellfish culture have been continued by the bureau during the past year. These are a study of the oyster and oyster farming, and the propagation of the fresh-water pearl mussel and the attendant problems of river pollution.

An experimental study of the physiology of spawning of Atlantic coast oysters was continued at the Woods Hole laboratory and was extended to the imported Japanese species. Later in the year studies of the nutrition of oysters were undertaken in order to devise means of improving the quality of the product and large-scale experiments have been started on plats of planted oysters at Milford, Conn.

Laboratory studies on the control of the starfish, which is such a destructive pest on oyster and scallop beds, were conducted at Woods Hole; and field experiments using copper salts to kill the animals or drive them from the beds have been conducted in Narragansett and Buzzards Bays.

Oyster cultural studies in the South Atlantic area have been referred to previously.

On the Pacific coast investigations of the native Olympia oyster are continuing at the laboratory at Olympia, Wash.

The problems of the American pearl-button industry, which depends upon the fresh-water mussel for its raw material, have received continued attention from the bureau's investigators. A rapidly diminishing supply of the valuable species led to the perfection of a practical method of propagation a few years ago only to find that increasing pollution rendered vast stretches of our rivers unfit for replanting with young. Even existing supplies of adult mussels were doomed to destruction by accumulating wastes from industries and domestic sewage combined with silt eroded from the farms and deforested lands. Studies have been directed to testing the feasibility of growing mussels commercially in artificial channels with controlled water supply at the Fort Worth (Tex.) station, where a large supply of brood mussels has been collected and grown for many months.

The adverse effects of river pollution have been so greatly aggravated by the construction of dams as a part of the War Department's program of canalization of important rivers in the Middle West that the bureau's investigators have given that phase of the pollution problem special attention and have cooperated with the United States Engineer Corps in making special studies of conditions at Keokuk and Wilson Dams and at Hastings (Minn.) pool with a view to mitigating the disadvantages to wild life in future construction projects. It is evident that while in itself the construction of dams in the Mississippi River or its tributaries will not adversely affect aquatic organisms but may indeed increase fish production, it will result in increasingly bad conditions until soil erosion is reduced and excessive sewage pollution is eliminated.

LAW-ENFORCEMENT DIVISION

The limited appropriation for the enforcement of the law regulating interstate transportation of black bass permitted the Bureau of Fisheries to organize in nearly all the States east of the one hundred and fifth meridian, and to obtain a reasonable enforcement of the law with 1 law enforcement officer, 2 black bass law inspectors, and 1 office assistant. At least two more inspectors are needed before satisfactory enforcement can be had. This is exclusive of the Rocky Mountain and Pacific Coast States, which can not be cared for under existing appropriations.

During the year the Secretary appointed 68 State wardens located in 25 States as deputy black bass law inspectors to assist the Federal officers in enforcing the law. These receive no salary from the Federal Government but have been of material assistance and have increased the cooperation already existing between the State fish and game authorities and the Federal officers.

Every effort has been made during the year to broadcast the provisions of the law and to obtain the cooperation of the fishing public, both commercial and sport. Conservation magazines, the daily press, and other publications have heartily cooperated and have published numerous articles relative to furthering the protection for and thus increasing the black bass.

As the Federal law is predicated on an infraction of an existing State law and an interstate transportation, it is essential that persons interested should know the various laws protecting the black bass, for which purpose Fishery Circular No. 9, containing a summary of the black bass laws for 1932, the Federal black bass law in full, and other valuable information pertaining to the protection and increase of game fish was published.

A large number of reports of infractions have been received and all investigated. Some failed to reveal any violation or it was found impossible to prove a violation of a State law. In several instances evidence of violation of State law was obtained which, at the request of the State authorities, was turned over to them for use in State court. In one instance four cases turned over to State authorities resulted in prosecution and conviction in State court, the imposition of a fine of $25 and costs in each case, and confiscation of the nets illegally used. Other similar cases are pending.

The Federal black bass law officers, by request, have rendered material assistance to State officers in breaking up violations of State laws, where interstate shipments were involved. The States thus aided include Arkansas, Kentucky, Pennsylvania, New Jersey, Florida, Illinois, Ohio, Indiana, Virginia, and Mississippi.

The division has been charged with the administration of the District of Columbia law providing for the issuance of permits to take fish for bait, and 21 of these permits are now outstanding. The division has prepared or assisted in preparing proposed laws, both State and Federal, for further protecting game fish, and on numerous occasions has been called on by State fish authorities and others for expert advice in matters relating to fish protection.

VESSEL NOTES

The *Albatross II* was engaged throughout the year in scientific research work between Cape Sable, Nova Scotia, and Cape Hatteras, N. C., between the shore line and continental shelf. At convenient times between cruises the vessel underwent necessary repairs at the Boston Navy Yard. The work was under the direction of O. E. Sette. Owing to a severe reduction in the vessel appropriation for the fiscal year 1933, it was necessary to put this vessel out of commission at the close of business June 30, and discharge all officers and crew with the exception of the master and four men whose services are required to care for the vessel while she is out of commission at the dock at the Woods Hole (Mass.) station.

The steamer *Phalarope* was employed as usual as a tender at the Woods Hole Biological Station except for a period during the latter part of April and the first half of May when she was at the Fort Humphreys station on the Potomac in connection with shad investigations. Owing to the reduced appropriation for the fiscal year 1933 the *Phalarope* was placed out of commission on June 30 and is now tied up at the Woods Hole station.

The steamer *Shearwater* was engaged in the usual fish-cultural work at the Put in Bay (Ohio) station during the fall and spring months.

The *Pelican* was engaged in the usual fish-cultural work at the Boothbay Harbor (Me.) station. During the period this vessel was not required for station activities it was detailed to the International Passamaquoddy Fisheries Commission to assist in special investigations for the commission.

The bureau's motor vessel *Fulmar*, stationed at Charlevoix, Mich., and assigned to investigative duty with the Great Lakes scientific staff, has been engaged, except for the period of winter lay-off when the Lakes are frozen, in experimental work on Lake Michigan for the purpose of studying means of preventing the destruction of undersized and immature fish by commercial nets. Experimental fishing stations were occupied weekly throughout the season at numerous points around the entire lake.

Sixteen vessels of the Alaska service cruised about 143,000 nautical miles in the fiscal year 1932, as compared with 145,408 nautical miles in 1931. The *Penguin* covered 28,000 miles and the *Crane* and *Brant* each about 14,000 miles.

The *Penguin* served the Pribilof Islands except in July and August, 1931, when conveying the Commissioner of Fisheries and official party on an inspection tour of Alaska. During this period the *Crane* was at the Pribilofs.

In southeast Alaska the *Auklet*, *Murre*, *Petrel*, and *Widgeon* engaged in fishery protective work. Other vessels were in that district part of the fall, after fishing to the westward ended, as follows: *Crane*, which had been in the Alaska Peninsula region, and transferring seasonal employees to and from Bristol Bay; *Teal*, on Cook Inlet; *Scoter*, on Bristol Bay; and *Kittiwake*, in the Seward-Katalla district. The *Blue Wing* and *Red Wing* patrolled the Kodiak-Afognak area and served the Afognak hatchery; the *Eider* also was in that district, except for two months when relieving the *Crane* in the Alaska Peninsula area. The *Ibis* was at Chignik, the *Merganser* in the Ikatan-Shumagin district, and the *Coot* on the Yukon River. The *Brant* engaged in general supervisory work in southeast Alaska and made several trips to Seattle. The *Brant* also was on patrol duty several weeks off Neah Bay, Wash., to protect the fur-seal herd during its migration northward. The *Widgeon* performed similar duty in southeast Alaska.

During the winter the *Auklet* and *Widgeon* were extensively rebuilt at Seattle, and other vessels were given a general overhauling. The *Merganser* has been assigned to the Yes Bay hatchery.

APPROPRIATIONS

Appropriations for the bureau for the fiscal year aggregated $2,905,540, as follows:

Salaries	$201, 660
Miscellaneous expenses:	
Administration	4, 400
Propagation of food fishes	1, 022, 760
Maintenance of vessels	316, 920
Inquiry respecting food fishes	300, 340
Fishery industries	116, 620
Protecting sponge fisheries	3, 100
Protecting seal and salmon fisheries of Alaska	446, 240
Upper Mississippi Wild Life and Fish Refuge	25, 000
Construction of stations	448, 500
Enforcement of black bass law	20, 000
	2, 905, 540

Very truly yours,

HENRY O'MALLEY,
Commissioner of Fisheries.

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ALASKA FISHERY AND FUR-SEAL INDUSTRIES IN 1931[1]

By WARD T. BOWER, *Chief, Division of Alaska Fisheries*

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[1] Appendix I to the Report of the U. S. Commissioner of Fisheries for 1932. Approved for publication May 11, 1932.

INTRODUCTION

The bureau's work in Alaska, which has to do primarily with the maintenance of the fishery resources and the management of the Pribilof Islands fur-seal industry, followed the same plan as in former years. Particular attention was given to problems concerning the conservation of the salmon, by far the most important economic product of the Territory. Careful observations of the runs were made throughout the season and restrictions in commercial fishing were modified from time to time to meet changing conditions. A general inspection of the fishery and fur-seal activities was made by the Commissioner of Fisheries, accompanied by an official party, during July and August.

In the patrol of the fishing grounds to enforce compliance with the fishery laws and regulations 15 bureau vessels and a number of chartered boats were employed, and more than 200 persons were identified with the work for varying periods. Incidental to patrol duties in certain localities were the destruction of predatory enemies of salmon and the removal of obstructions that blocked the passage of salmon to the spawning grounds.

Studies of the life history of the salmon, herring, and other aquatic resources were continued. Weirs for counting the escapement of brood fish were operated in 27 typical salmon streams as a means of determining the ratio of escape to catch and the size of a spawning colony required to insure ample seeding of the beds and thus an unimpaired future run. Fish-cultural work was carried on at two Government hatcheries and one private hatchery.

Sealing operations at the Pribilof Islands resulted in the take of 49,524 fur-seal skins, or about 17 per cent more than the number obtained in 1930. Killings in general were from surplus 3-year-old male seals. A suitable number of animals of this age class were reserved for future breeding stock. The computation of the herd as of August 10, 1931, by bureau employees at the islands showed 1,127,082 animals of all classes, an increase of 81,981 over the corresponding figures for the previous year. The fox herds on St. Paul and St. George Islands were in satisfactory condition and yielded 1,401 blue and 25 white pelts in the 1931–32 season.

Progress was made in the construction of new buildings and the installation of additional equipment to facilitate handling the increased fur-seal work, and some extension of improved roads was accomplished on both islands.

Through the cooperation of the Navy Department the general shipment of supplies for the Pribilof Islands was forwarded on the U. S. S. *Vega*, and the sealskins taken during the season were transported on the return trip to Seattle. Valuable assistance was rendered also by the U. S. Coast Guard in maintaining a patrol for the protection of the fur-seal herd.

Three public auction sales of fur-seal skins were held in 1931, at two of which fox skins from the Pribilof Islands were sold also.

Acknowledgment is made of the assistance rendered by members of the bureau's staff in the preparation of this document.

VISIT OF THE COMMISSIONER OF FISHERIES TO ALASKA

The Commissioner of Fisheries sailed from Seattle aboard the *Penguin* on June 28 for the annual inspection of the fisheries of Alaska. Brief stops were made in southeastern Alaska, and on July 4 the *Penguin* departed from Juneau for Bristol Bay, via False Pass. A trip was made also to the Pribilof Islands, where sealing operations were observed. On the return trip the *Penguin* called at Kodiak, where Commissioner O'Malley boarded a commercial steamer on July 24 for the return trip to Juneau. The greater part of August was devoted to a study of fishery conditions in southeastern Alaska.

Commissioner O'Malley was accompanied on his inspection trip by Senator Frederic C. Walcott, chairman of the Senate Committee on Wild Life Resources, the secretary of this committee, and others interested in the conservation of the fishery resources of the Territory.

Following his visit to Alaska the commissioner spent several days in the Pacific Coast States in connection with important fishery matters and returned to Washington on September 11.

EXECUTIVE ORDER RESTORING CERTAIN LANDS FROM ALASKA SALMON HATCHERY RESERVATION

Under date of June 8, 1931, an Executive order was issued restoring to public entry a small tract of land not needed in connection with the Yes Bay fish-cultural reservation. The text of the order is as follows:

> It is hereby ordered that Executive order of February 1, 1906, reserving certain lands on Yes Lake in the Cleveland Peninsula in southeastern Alaska as a site for a salmon hatchery be, and the same is hereby, revoked as to the tract of land now identified as United States Survey No. 1981, comprising 6.33 acres.

FISHERY INDUSTRIES

As in corresponding reports for previous years, the Territory of Alaska is here considered in the three coastal geographic sections generally recognized, as follows: (1) Southeast Alaska—embracing all that narrow strip of mainland and the numerous adjacent islands from Portland Canal northwestward to and including Yakutat Bay; (2) central Alaska—the region on the Pacific from Yakutat Bay westward, including Prince William Sound, Cook Inlet, and the southern coast of Alaska Peninsula, to Unimak Pass; and (3) western Alaska—the north shore of the Alaska Peninsula, including the Aleutian Islands westward from Unimak Pass, Bristol Bay, and the Kuskokwim and Yukon Rivers. These divisions are solely for statistical purposes and do not coincide with areas established in departmental regulations.

Detailed reports and statistical tables dealing with the various fishery industries are presented herewith, and there are also given the important features of certain subjects that were the objects of special investigation or inquiry.

NEW FISHERY REGULATIONS

The regulations for the protection of the fisheries of Alaska, issued December 18, 1930, were amended by the following regulations issued by the Acting Secretary of Commerce under the dates indicated:

[*March 6, 1931*]

BRISTOL BAY AREA

Salmon fishery.—Regulation No. 3 is amended to read as follows: Each gill net in operation shall be marked by a cluster of floats or corks at the ends, and double floats or corks shall be attached to the cork line at 25-fathom intervals. The clusters of floats or corks at the ends and the double floats or corks at the 25-fathom intervals shall be painted bright red. The clusters at the ends shall also be legibly and plainly marked with the initials of the operator.

ALASKA PENINSULA AREA

Salmon fishery.—1. Regulation No. 15 is amended to read as follows: Commercial fishing for salmon along the mainland shore on the south side of Alaska Peninsula from Kabuch Point easterly to Morgan Point is prohibited prior to July 15 in each year: *Provided*, That this prohibition shall not apply to the waters of Morzhovoi Bay west of 163 degrees 1 minute 45 seconds west longitude after 6 o'clock antemeridian June 1 in each year.

2. Regulation No. 16 is amended to read as follows: Commercial fishing for salmon along the mainland shore on the south side of Alaska Peninsula from a point on the coast one statute mile northwesterly of the outer extremity of Moss Cape to the outer extremity of Kupreanof Point is prohibited prior to July 1 in each year.

3. Regulation No. 17 is amended to read as follows: All commercial fishing for salmon, except by beach seines not exceeding 65 fathoms in length, is prohibited (*a*) in all waters between Cape Tachilni and the southern extremity of Bold Cape, and (*b*) in all waters from Cape Tolstoi to the outer extremity of Kupreanof Point.

4. Regulation No. 22 (*d*) is amended to read as follows: Along the coast on the west side of Morzhovoi Bay within 2,500 feet measured along the coast from a point at 55 degrees 1 minute north latitude, 163 degrees 11 minutes 9 seconds west longitude.

5. Regulation No. 22 (*l*) is amended to read as follows: Mainland coast along the west side of Pavlof Bay from 55 degrees 15 minutes 30 seconds north latitude to 55 degrees 20 minutes north latitude.

6. Regulation No. 22 (*n*) is amended to read as follows: Unga and Popof Islands: East coast of Unga Island (1) from a point at 55 degrees 13 minutes 39 seconds north latitude, 160 degrees 30 minutes west longitude, easterly and southerly to a point at 55 degrees 13 minutes 15 seconds north latitude, 160 degrees 29 minutes 42 seconds west longitude, and (2) from a point at 55 degrees 12 minutes 10 seconds north latitude, 160 degrees 29 minutes 42 seconds west longitude, southerly and easterly to a point at 55 degrees 11 minutes 30 seconds north latitude, 160 degrees 27 minutes 30 seconds west longitude, and east coast of Popof Island within 2,500 feet of a point at 55 degrees 16 minutes north latitude, 160 degrees 19 minutes 40 seconds west longitude.

7. All commercial fishing for salmon is prohibited in all waters of Orzinski (Orzenoi) Bay.

CHIGNIK AREA

Herring fishery.—1. Regulation No. 6 is amended to read as follows: Commercial fishing for herring, except for bait purposes, by means of any purse seine is prohibited.

2. Commercial fishing for herring, including bait fishing, by means of any beach seine more than 50 fathoms in length is prohibited.

KODIAK AREA

Salmon fishery.—1. Regulation No. 3 is amended to read as follows: Beach seines shall be set from the beach only, and one end of the seine must remain on the beach until the set is completed. No beach seine shall be used as a purse seine. No beach seine shall be set as a trap or as a lead and left without reasonably prompt completion of the seining operation.

2. Regulation No. 10 is amended to read as follows: Commercial fishing for salmon in Karluk waters extending from Cape Karluk to West Point and from Raspberry Cape to a point at the entrance of Raspberry Strait at 58 degrees 7 minutes 45 seconds north latitude, 153 degrees 14 minutes west longitude, is prohibited prior to 6 o'clock antemeridian June 1 in each year. The take of red salmon in these waters shall not exceed 50 per cent of the total run as determined at the weir in Karluk River operated by the Bureau of Fisheries.

3. Regulation No. 15 is amended to read as follows: Commercial fishing for salmon is prohibited from August 15 to August 31, both dates inclusive: *Provided*, That this prohibition shall not apply (1) to beach seines on the north coast of Kodiak Island from Cape Karluk to Cape Uyak, (2) to set gill nets on the north coast of Kodiak Island from Cape Uyak to West Point, (3) to traps (*a*) on the west shore of Kodiak Island from Chief Point to West Point and on the west coast of Raspberry Island from Raspberry Cape to a point at the entrance to Raspberry Strait at 58 degrees 7 minutes 45 seconds north latitude, 153 degrees 14 minutes west longitude, (*b*) to traps on Afognak Island, (*c*) to traps on the north shore of the entrance to Moser Bay within 1 statute mile outside of Bun Point, and (*d*) on the east side of Turn Island.

4. Regulation No. 18 (*j*) is amended to read as follows: Kodiak Island near entrance to Uyak Bay: Along the coast (1) within 2,500 feet of a point at 57 degrees 46 minutes north latitude, 153 degrees 56 minutes 24 seconds west longitude, and (2) within 5,000 feet easterly of a point at 57 degrees 41 minutes 48 seconds north latitude, 153 degrees 54 minutes 45 seconds west longitude.

5. Regulation No. 19 (*l*) is amended to read as follows: Kiliuda Bay: All waters of the bay west of 153 degrees 3 minutes west longitude.

COOK INLET AREA

Salmon fishery.—1. Regulation No. 1 is amended to read as follows: North of 60 degrees 20 minutes north latitude commercial fishing for salmon is prohibited prior to 6 o'clock antemeridian June 5 and after 6 o'clock postmeridian August 1 in each year. Between 60 degrees 20 minutes north latitude and the latitude of Anchor Point Light commercial fishing for salmon is prohibited prior to 6 o'clock antemeridian June 5 in each year: *Provided*, That this prohibition shall not apply to the use of gill nets of mesh not less than 8½ inches stretched measure between knots after 6 o'clock antemeridian June 1. Between 60 degrees 20 minutes north latitude and the latitude of Anchor Point Light commercial fishing for salmon is prohibited after 6 o'clock postmeridian August 1 in each year. South of the latitude of Anchor Point Light commercial fishing for salmon is prohibited prior to 6 o'clock antemeridian June 10 in each year: *Provided*, That this prohibition shall not apply to the use of gill nets of mesh not less than 8½ inches stretched measure between knots after 6 o'clock antemeridian May 20. South of the latitude of Anchor Point Light commercial fishing for salmon is prohibited after 6 o'clock postmeridian August 5 in each year, except that beach seines may be operated south of the latitude of Anchor Point Light in the period from 6 o'clock antemeridian August 20 to 6 o'clock postmeridian September 3.

2. Regulation No. 14 (*l*) is amended to read as follows: Along the mainland coast on the east side of Cook Inlet (1) on the west side of Nubble Point Spit within 1,200 feet of a point at 59 degrees 28 minutes 45 seconds north latitude, 151 degrees 35 minutes 6 seconds west longitude, and (2) within 1,000 feet of a point at 59 degrees 28 minutes 30 seconds north latitude, 151 degrees 37 minutes west longitude.

BERING RIVER AREA

Salmon fishery.—1. The regulation prohibiting commercial fishing for salmon at all times is amended so as to permit commercial fishing for salmon from 6 o'clock antemeridian August 10 to 6 o'clock postmeridian September 20 in each calendar year.

2. Commercial fishing shall be conducted solely by drift gill nets, or by gill nets attached to anchored boats or other anchored floating equipment and operated in substantially a straight line.

SOUTHEASTERN ALASKA AREA

WESTERN DISTRICT

Salmon fishery. Regulation No. 19 (*m*) is amended to read as follows: Admiralty Island: West coast from a point north of Wilson Cove at 57 degrees 10 minutes 30 seconds north latitude to Point Caution, exclusive of the coast (1) between 57 degrees 10 minutes 40 seconds north latitude and 57 degrees 11 minutes 50 seconds north latitude and (2) between 57 degrees 13 minutes 15 seconds north latitude and 57 degrees 14 minutes 30 seconds north latitude.

NORTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—Regulation No. 17 (*ss*) is amended to read as follows: Prince of Wales Island: East coast from the northern extremity of Clover Point to a point at 55 degrees 22 minutes 17 seconds north latitude, 132 degrees 11 minutes 40 seconds west longitude, exclusive of the coast (1) between a point at 55 degrees 20 minutes 51 seconds north latitude, 132 degrees 9 minutes 43 seconds west longitude, and a point at 55 degrees 21 minutes 52 seconds north latitude, 132 degrees 10 minutes west longitude, and (2) between 55 degrees 19 minutes 5 seconds north latitude and 55 degrees 20 minutes 10 seconds north latitude.

SOUTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—Regulation No. 15 (*h*) is amended to read as follows: Long Island, east of Dall Island: East and west coasts within 2,500 feet measured along the coast from 54 degrees 46 minutes 15 seconds north latitude.

SOUTHERN DISTRICT

Salmon fishery.—Regulation No. 17 (*p*) is amended to read as follows: Foggy Bay to Cape Fox: From within 1 statute mile northward and eastward of Foggy Point to the southern extremity of Cape Fox, including Cape Fox Island and the western shore of the unnamed island at 54 degrees 47 minutes 26 seconds north latitude, 130 degrees 55 minutes 10 seconds west longitude.

GENERAL REGULATIONS, EFFECTIVE IN ALL WATERS OF ALASKA

General Regulation No. 3 is amended to read as follows: The use of any wire spiller in connection with any fish trap will be permitted only when an inner spiller of webbing also is used, conforming in size and shape with the outer wire spiller. The web spiller shall be so constructed as to prevent salmon or other fishes from passing over its walls and becoming caught between it and the wire spiller.

[*March 17, 1931*]

KODIAK AREA

Salmon fishery.—1. Regulation No. 18 (*i*) is amended to read as follows: Kodiak Island: Along the coast on the west side of Uganik Bay between West Point and Broken Point: *Provided*, That in 1931 no trap shall be permitted to operate between West Point and a point at 57 degrees 50 minutes 15 seconds north latitude, 153 degrees 37 minutes 5 seconds west longitude.

2. Regulation No. 18 (*n*) is amended to read as follows: Kodiak Island: Within 2,500 feet of a point on the south shore of Kiliuda Bay at 57 degrees 16 minutes 17 seconds north latitude, 153 degrees 1 minute 54 seconds west longitude: *Provided*, That no trap shall be permitted to operate in 1931.

3. Regulation No. 18 (*o*) is amended to read as follows: Kodiak Island: Coast from a point 1 statute mile westward of Sitkalidak or Old Harbor Narrows southwestward for a distance of 5,000 feet: *Provided*, That no trap shall be permitted to operate in 1931.

COOK INLET AREA

Salmon fishery.—1. Regulation No. 14 (*g*) is amended to read as follows: Along the mainland coast on the east side of Cook Inlet from the northern extremity of Point Possession southwesterly to a point at 60 degrees 58 minutes 22 seconds north latitude, 150 degrees 36 minutes 30 seconds west longitude, exclusive of 1 statute mile each side of the mouths of all salmon streams and exclusive of the coast within 1,000 feet of a point at 61 degrees 2 minutes north latitude, 150 degrees 24 minutes 45 seconds west longitude: *Provided*, That in 1931 no trap will be permitted to operate northerly of the point on the coast 1,000 feet southerly of the point at 61 degrees 2 minutes north latitude, 150 degrees 24 minutes 45 seconds west longitude.

2. Regulation No. 14 (*j*) is amended to read as follows: Along the mainland coast on the east side of Cook Inlet (1) from a point north of Boulder Point at 60 degrees 46 minutes 18 seconds north latitude, 151 degrees 15 minutes 40 seconds west longitude, southerly to a point at 60 degrees 44 minutes 1 second north latitude, 151 degrees 19 minutes 58 seconds west longitude; (2) from a point at 60 degrees 43 minutes 44 seconds north latitude, 151 degrees 22 minutes 12 seconds west longitude, southerly to a point at 60 degrees 19 minutes 39 seconds north latitude, 151 degrees 23 minutes 24 seconds west longitude, exclusive of 2½ statute miles each side of the mouth of Kenai River, 2½ statute miles each side of the mouth of Kasilof River, and 1 statute mile each side of the mouths of all other salmon streams; and (3) from a point at 60 degrees 18 minutes 48 seconds north latitude, 151 degrees 23 minutes 20 seconds west longitude, southerly to a point 2 statute miles northward from the mouth of Anchor Point River, exclusive of 2 statute miles each side of the mouth of Ninilchik River, 2 statute miles each side of the mouth of Deep Creek, 1 statute mile each side of the mouths of all other salmon streams, and exclusive of the coast within 6,000 feet of a point at 59 degrees 57 minutes 50 seconds north latitude, 151 degrees 44 minutes 17 seconds west longitude, and of the coast within ½ statute mile of a point at 59 degrees 50 minutes 10 seconds north latitude, 151 degrees 49 minutes 30 seconds west longitude: *Provided*, That in 1931 no trap shall be permitted to operate (1) within 3,500 feet northward of the point 2 statute miles northward from the mouth of Anchor Point River, (2) within 2,500 feet of a point at 59 degrees 54 minutes north latitude, 151 degrees 46 minutes 30 seconds west longitude, (3) within 2,500 feet of a point at 59 degrees 54 minutes 28 seconds north latitude, 151 degrees 46 minutes 8 seconds west longitude, and (4) within 2,500 feet of a point at 60 degrees 15 minutes 47 seconds north latitude, 151 degrees 23 minutes 36 seconds west longitude.

3. Regulation No. 14 (*l*) is amended to read as follows: Along the mainland coast on the east side of Cook Inlet (1) on the west side of Nubble Point Spit within 1,200 feet of a point at 59 degrees 28 minutes 45 seconds north latitude, 151 degrees 35 minutes 6 seconds west longitude, and (2) within 1,000 feet of a point at 59 degrees 28 minutes 30 seconds north latitude, 151 degrees 37 minutes west longitude: *Provided*, That in 1931 no trap shall be permitted to operate within 1,000 feet of the point at 59 degrees 28 minutes 30 seconds north latitude, 151 degrees 37 minutes west longitude.

4. Regulation No. 14 (*n*) is amended to read as follows: Along the mainland coast on the east side of Cook Inlet within 1,000 feet of a point at 59 degrees 25 minutes 35 seconds north latitude, 151 degrees 52 minutes west longitude, and from a point at 59 degrees 24 minutes 30 seconds north latitude, 151 degrees 53 minutes 45 seconds west longitude, southerly to a point at 59 degrees 23 minutes 12 seconds north latitude, 151 degrees 54 minutes west longitude: *Provided*, That in 1931 no trap shall be permitted to operate within 1,000 feet of the point at 59 degrees 25 minutes 35 seconds north latitude, 151 degrees 52 minutes west longitude.

PRINCE WILLIAM SOUND AREA

Salmon fishery.—1. Regulation No. 11 (*e*) is amended to read as follows: Within 1 statute mile eastward of the southwestern extremity of Naked Island: *Provided*, That no trap shall be permitted to operate in 1931.

2. Regulation No. 11 (*h*) is amended to read as follows: Western side of Valdez Arm from Point Freemantle to 60 degrees 59 minutes north latitude: *Provided*, That in 1931 no trap shall be permitted to operate between 60 degrees 56 minutes north latitude and 60 degrees 57 minutes 40 seconds north latitude.

3. Regulation No. 11 (*m*) is amended to read as follows: Within ½ statute mile of the northern extremity of the land between Two Moon Bay and Snug Corner Cove: *Provided*, That no trap shall be permitted to operate in 1931.

4. Regulation No. 11 (*w*) is amended to read as follows: Hinchinbrook Island: Within 2,500 feet, measured along the coast, from a point at 60 degrees 28 minutes 54 seconds north latitude, 146 degrees 32 minutes 11 seconds west longitude: *Provided*, That no trap shall be permitted to operate in 1931.

5. Regulation No. 11 (*x*) is amended to read as follows: Hinchinbrook Island: From a point on the coast at 60 degrees 27 minutes north latitude, 146 degrees 39 minutes 48 seconds west longitude, northward to the light at Johnstone Point: *Provided*, That in 1931 no trap shall be permitted to operate south of 60 degrees 28 minutes north latitude.

6. Regulation No. 11 (*aa*) is amended to read as follows: Montague Island: Along the coast within 2,500 feet from a point at 59 degrees 47 minutes north latitude, 147 degrees 55 minutes 50 seconds west longitude: *Provided*, That no trap shall be permitted to operate in 1931.

7. Regulation No. 11 (*bb*) is amended to read as follows: Montague Island: Along the coast from a point on the south side of Macleod Harbor at 59 degrees 52 minutes 10 seconds north latitude, 147 degrees 51 minutes west longitude, to a point at 59 degrees 50 minutes 49 seconds north latitude, 147 degrees 54 minutes 6 seconds west longitude: *Provided*, That in 1931 no trap shall be permitted to operate except within 2,500 feet southwesterly of the point at 59 degrees 52 minutes 10 seconds north latitude, 147 degrees 51 minutes west longitude.

8. Regulation No. 11 (*cc*) is amended to read as follows: Western coast of Montague Island from Point Woodcock to a point on the south side of Hanning Bay at 147 degrees 42 minutes 40 seconds west longitude: *Provided*, That in 1931 no trap shall be permitted to operate north of 59 degrees 55 minutes 10 seconds north latitude.

9. Regulation No. 11 (*dd*) is amended to read as follows: Western coast of Montague Island from the north side of the entrance to Hanning Bay northeasterly to 60 degrees 9 minutes 45 seconds north latitude (as shown on U. S. Coast and Geodetic Survey chart No. 8551): *Provided*, That in 1931 no trap shall be permitted to operate from a point at 60 degrees 1 minute 50 seconds north latitude, 147 degrees 34 minutes 40 seconds west longitude, to a point at 60 degrees 6 minutes 6 seconds north latitude.

10. Regulation No. 11 (*ee*) is amended to read as follows: Western coast of Montague Island from a point at 60 degrees 10 minutes 20 seconds north latitude northeasterly to a point at 60 degrees 12 minutes 17 seconds north latitude, 147 degrees 17 minutes 15 seconds west longitude (as shown on U. S. Coast and Geodetic Survey chart No. 8551): *Provided*, That no trap shall be permitted to operate in 1931.

11. Regulation No. 11 (*ff*) is amended to read as follows: Northern coast of Montague Island from Graveyard Point to a point on the coast ½ statute mile westerly of Montague Point: *Provided*, That in 1931 no trap shall be operated north of 60 degrees 21 minutes 30 seconds north latitude.

SOUTHEASTERN ALASKA AREA

ICY STRAIT DISTRICT

Salmon fishery.—1. Regulation No. 16 (*b*) is amended to read as follows: Inian Islands: (1) North of 58 degrees 15 minutes 42 seconds north latitude, exclusive of the east end of the northeastern island; and (2) southwest coast of the northwestern island between 58 degrees 15 minutes 42 seconds north latitude and 58 degrees 15 minutes 18 seconds north latitude: *Provided*, That in 1931 no trap shall be operated east of 136 degrees 20 minutes west longitude.

2. Regulation No. 16 (*l*) is amended to read as follows: Mainland: From a point on the east side of Excursion Inlet at 58 degrees 23 minutes north latitude southward to 135 degrees 8 minutes 40 seconds west longitude: *Provided*, That in 1931 no trap shall be permitted to operate between 58 degrees 18 minutes 45 seconds north latitude and 58 degrees 16 minutes 55 seconds north latitude.

WESTERN DISTRICT

Salmon fishery.—1. Regulation No. 19 (*c*) is amended to read as follows: Chichagof Island: Eastern coast from a point at 58 degrees 2 minutes 8 seconds north latitude, 134 degrees 56 minutes 26 seconds west longitude, southerly to North Passage Point, exclusive of False Bay, and during 1931 exclusive also of the coast between 57 degrees 59 minutes 20 seconds north latitude and 58 degrees 1 minute 15 seconds north latitude.

2. Regulation No. 19 (*d*) is amended to read as follows: Chichagof Island: Eastern coast from South Passage Point to Point Hayes, exclusive of (1) Basket Bay and within ½ statute mile of each side of its entrance, and (2) exclusive of the coast from 57 degrees 33 minutes north latitude southerly to 57 degrees 30 minutes 30 seconds north latitude: *Provided*, That in 1931 no trap shall be permitted to operate (1) south of 57 degrees 34 minutes 40 seconds north latitude, (2) between 57 degrees 36 minutes 20 seconds north latitude and 57 degrees 38 minutes 28 seconds north latitude, (3) between 57 degrees 42 minutes north latitude and 57 degrees 44 minutes 6 seconds north latitude and (4) north of 57 degrees 44 minutes 31 seconds north latitude.

3. Regulation No. 19 (*e*) is amended to read as follows: Baranof Island: From a point ½ statute mile south of Point Thatcher to Point Lull, exclusive of the coast between 57 degrees 20 minutes 35 seconds north latitude and 57 degrees 23 minutes 30 seconds north latitude: *Provided*, That in 1931 no trap shall be permitted to operate south of 57 degrees 20 minutes 35 seconds north latitude.

4. Regulation No. 19 (*g*) is amended to read as follows: Baranof Island: East coast from a point at the south side of the entrance to Kasnyku Bay at 57 degrees 12 minutes north latitude to a point 1 statute mile northwesterly of Point Turbot: *Provided*, That in 1931 no trap shall be permitted to operate north of 57 degrees 11 minutes 10 seconds north latitude.

5. Regulation No. 19 (*k*) is amended to read as follows: Admiralty Island: West coast from a point ¾ statute mile north of Parker Point to 58 degrees 2 minutes north latitude, exclusive of the coast (1) between 57 degrees 47 minutes north latitude and 57 degrees 48 minutes 30 seconds north latitude, and (2) between 57 degrees 51 minutes north latitude and 57 degrees 53 minutes 30 seconds north latitude, and during 1931 exclusive also of the coast (1) between 57 degrees 43 minutes 24 seconds north latitude and 57 degrees 46 minutes north latitude, (2) between 57 degrees 53 minutes 30 seconds north latitude and 57 degrees 54 minutes 40 seconds north latitude, and (3) between 57 degrees 55 minutes 15 seconds north latitude and 57 degrees 45 minutes north latitude.

6. Regulation No. 19 (*l*) is amended to read as follows: Admiralty Island: West coast from Village Point to Distant Point: *Provided*, That in 1931 no trap shall be permitted to operate south of 57 degrees 22 minutes 15 seconds north latitude.

7. Regulation No. 19 (*m*) is amended to read as follows: Admiralty Island: West coast from a point north of Wilson Cove at 57 degrees 10 minutes 30 seconds north latitude to Point Caution, exclusive of the coast (1) between 57 degrees 10 minutes 40 seconds north latitude and 57 degrees 11 minutes 50 seconds north latitude and (2) between 57 degrees 12 minutes 25 seconds north latitude and 57 degrees 14 minutes 30 seconds north latitude: *Provided*, That in 1931 no trap shall be permitted to operate between 57 degrees 10 minutes 30 seconds north latitude and 57 degrees 10 minutes 40 seconds north latitude.

EASTERN DISTRICT

Salmon fishery.—1. Regulation No. 17 (*b*) is amended to read as follows: Mainland: From the south side of Limestone Inlet at 58 degrees 1 minute 30 seconds north latitude southward to a point at 57 degrees 59 minutes 10 seconds north latitude: *Provided*, That in 1931 no trap shall be permitted to operate between 58 degrees north latitude and 58 degrees 1 minute 12 seconds north latitude.

2. Regulation No. 17 (*f*) is amended to read as follows: Mainland, between Hobart Bay and Windham Bay: From a point at 57 degrees 26 minutes 20 seconds north latitude to a point at 57 degrees 30 minutes north latitude: *Provided*, That during 1931 no trap shall be operated south of 57 degrees 27 minutes 20 seconds north latitude.

3. Regulation No. 17 (*h*) is amended to read as follows: Mainland, Frederick Sound: From a point on the south side of Fanshaw Bay at 133 degrees 32 minutes 30 seconds west longitude to Cape Fanshaw, thence southeasterly to 133 degrees 21 minutes west longitude, excluding coast between 133 degrees 22 minutes west longitude and 133 degrees 26 minutes west longitude and during 1931 exclusive also of the coast between 133 degrees 26 minutes west longitude and 133 degrees 30 minutes west longitude.

4. Regulation No. 17 (*l*) is amended to read as follows: Kupreanof Island: Northwest coast (1) from a point ½ statute mile southeast of the outer extremity of Point Macartney northward to a point at 57 degrees 1 minute 40 seconds north latitude, 134 degrees 1 minute west longitude, and (2) from a point at 57 degrees 3 minutes 15 seconds north latitude, 134 degrees 1 minute 15 seconds west longitude, to a point on the north shore at 57 degrees 5 minutes 50 seconds north latitude, 133 degrees 54 minutes 20 seconds west longitude, excluding coast between 133 degrees 56 minutes 45 seconds west longitude and 134 degrees 1 minute west longitude: *Provided*, That during 1931 no trap shall be permitted to operate (1) on the north side of Point Macartney from the outer extremity of Point Macartney to a point at 57 degrees 1 minute 40 seconds north latitude, 134 degrees 1 minute west longitude and (2) north of 57 degrees 5 minutes north latitude (as shown on U. S. Coast and Geodetic Survey chart No. 8200).

5. Regulation No. 17 (*n*) is amended to read as follows: Kuiu Island: Northwest coast from a point 1 statute mile north of the north side of the entrance to

Washington Bay northward to the point at the east side of the entrance to Band Cove: *Provided*, That in 1931 no trap shall be permitted to operate between 56 degrees 45 minutes 50 seconds north latitude and 56 degrees 47 minutes 50 seconds north latitude.

NORTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—1. Regulation No. 17 (*a*) is amended to read as follows: San Juan Bautista Island: From a point on the west coast at 55 degrees 25 minutes 45 seconds north latitude southerly and easterly to a point on the south coast at 55 degrees 24 minutes north latitude, 133 degrees 18 minutes 30 seconds west longitude: *Provided*, That in 1931 no trap shall be permitted to operate south of 55 degrees 24 minutes 45 seconds north latitude. A part of these waters is in the South Prince of Wales Island district.

2. Regulation No. 17 (*e*) is amended to read as follows: Culebra Island: Coast west of 133 degrees 26 minutes 30 seconds west longitude: *Provided*, That no trap shall be permitted to operate in 1931.

3. Regulation No. 17 (*i*) is amended to read as follows: Heceta Island: Western and southern coasts from a point on the coast at 55 degrees 45 minutes 16 seconds north latitude, 133 degrees 40 minutes west longitude, to a point on the coast at 55 degrees 41 minutes 30 seconds north latitude, 133 degrees 31 minutes 40 seconds west longitude, excluding the coast between a point at 55 degrees 44 minutes 50 seconds north latitude, 133 degrees 39 minutes 9 seconds west longitude, and a point at 55 degrees 43 minutes 7 seconds north latitude, 133 degrees 37 minutes 23 seconds west longitude: *Provided*, That in 1931 no trap shall be permitted to operate between a point at 55 degrees 45 minutes 16 seconds north latitude, 133 degrees 40 minutes west longitude, and a point at 55 degrees 44 minutes 50 seconds north latitude, 133 degrees 39 minutes 9 seconds west longitude.

4. Regulation No. 17 (*n*) is amended to read as follows: Kosciusko Island: Western coast (1) within 5,000 feet southerly of Ruins Point at 56 degrees 4 minutes north latitude, (2) within 5,000 feet northerly of 55 degrees 59 minutes 40 seconds north latitude, and (3) the small islet at the north point of the entrance to Pole Anchorage, but no trap shall be operated off this islet in 1931.

5. Regulation No. 17 (*q*) is amended to read as follows: Warren Island, near Kosciusko Island: East coast of Warren Island within 2,000 feet of a point at 55 degrees 53 minutes 10 seconds north latitude: *Provided*, That no trap shall be permitted to operate in 1931.

6. Regulation No. 17 (*r*) is amended to read as follows: Kuiu Island: East coast within 2,500 feet southerly from a point on the coast near the entrance to Port McArthur at 56 degrees 3 minutes north latitude: *Provided*, That no trap shall be permitted to operate in 1931.

7. Regulation No. 17 (*s*) is amended to read as follows: Kuiu Island: East coast within 2,500 feet from a point at 56 degrees 13 minutes 19 seconds north latitude, 133 degrees 52 minutes 35 seconds west longitude: *Provided*, That no trap shall be permitted to operate in 1931.

8. Regulation No. 17 (*w*) is amended to read as follows: Prince of Wales Island: North coast from Pine Point to Point Colpoys: *Provided*, That in 1931 no trap shall be permitted to operate west of 133 degrees 12 minutes 30 seconds west longitude.

9. Regulation No. 17 (*x*) is amended to read as follows: Kupreanof Island: Southern coast within 2,500 feet from a point at 56 degrees 26 minutes 8 seconds north latitude, 133 degrees 29 minutes 35 seconds west longitude: *Provided*, That no trap shall be permitted to operate in 1931.

10. Regulation No. 17 (*y*) is amended to read as follows: Etolin Island: West coast from 56 degrees 18 minutes north latitude southward to Steamer Point, exclusive of the coast between 132 degrees 38 minutes west longitude and 56 degrees 15 minutes north latitude: *Provided*, That in 1931 no trap shall be permitted to operate north of 56 degrees 16 minutes 40 seconds north latitude.

11. Regulation No. 17 (*ee*) is amended to read as follows: Blashke Island: Coast west of 132 degrees 55 minutes west longitude: *Provided*, That no trap shall be permitted to operate in 1931.

12. Regulation No. 17 (*jj*) is amended to read as follows: Onslow Island: West coast from Gull Point to Ernest Point: *Provided*, That in 1931 no trap shall be permitted to operate north of 55 degrees 51 minutes 45 seconds north latitude.

13. Regulation No. 17 (*oo*) is amended to read as follows: Cleveland Peninsula: From a point on the east side of Clarence Strait at 55 degrees 44 minutes 7 seconds north latitude, 132 degrees 15 minutes 36 seconds west longitude, southerly

to Caamano Point, thence northeasterly to a point at 55 degrees 34 minutes 5 seconds north latitude near the south side of the entrance to Smugglers Cove, exclusive of the east side of Clarence Strait (1) between 132 degrees 2 minutes west longitude and 132 degrees 4 minutes west longitude, (2) between 55 degrees 33 minutes 30 seconds north latitude and 55 degrees 34 minutes 45 seconds north latitude, (3) between 55 degrees 36 minutes 10 seconds north latitude and 55 degrees 38 minutes north latitude, (4) between 55 degrees 40 minutes north latitude and 55 degrees 41 minutes 10 seconds north latitude, and (5) between 55 degrees 41 minutes 45 seconds north latitude and 55 degrees 43 minutes north latitude: *Provided,* That in 1931 no trap shall be permitted to operate (1) between 55 degrees 41 minutes 10 seconds north latitude and 55 degrees 41 minutes 45 seconds north latitude, (2) between 55 degrees 38 minutes north latitude and 55 degrees 39 minutes 30 seconds north latitude, and (3) along the shore of Bond Bay. A part of these waters is in the southern district.

14. Regulation No. 17 (*aaa*) is amended to read as follows: Prince of Wales Island: From a point on Cape Chacon at 54 degrees 41 minutes 23 seconds north latitude, 132 degrees 1 minute west longitude, northerly to a point at approximately 54 degrees 45 minutes north latitude, 132 degrees west longitude: *Provided,* That in 1931 no trap shall operate except within 2,500 feet of a point at 54 degrees 43 minutes 5 seconds north latitude, 132 degrees 54 minutes west longitude.

15. During 1931 commercial fishing for salmon by means of any trap is prohibited along the east coast of Prince of Wales Island from a point ½ statute mile northwest of Luck Point at 55 degrees 52 minutes 25 seconds north latitude southward to a point at approximately 54 degrees 45 minutes north latitude, 132 degrees west longitude, including Grindall, Wedge, and Polk Islands, except as follows:

(*a*) Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 57 minutes north latitude, 132 degrees 41 minutes 59 seconds west longitude.

(*b*) Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 55 minutes 34 seconds north latitude, 132 degrees 38 minutes 59 seconds west longitude.

(*c*) Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 54 minutes 28 seconds north latitude, 132 degrees 36 minutes 59 seconds west longitude.

(*d*) Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 50 minutes 57 seconds north latitude, 132 degrees 32 minutes 43 seconds west longitude.

(*e*) Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 47 minutes 50 seconds north latitude, 132 degrees 29 minutes west longitude.

(*f*) Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 38 minutes 38 seconds north latitude, 132 degrees 21 minutes 23 seconds west longitude.

(*g*) Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 36 minutes 25 seconds north latitude, 132 degrees 20 minutes 47 seconds west longitude.

(*h*) Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 34 minutes 2 seconds north latitude, 132 degrees 18 minutes 42 seconds west longitude.

(*i*) Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 32 minutes 25 seconds north latitude, 132 degrees 16 minutes west longitude.

(*j*) Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 30 minutes 56 seconds north latitude, 132 degrees 12 minutes 14 seconds west longitude.

(*k*) Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 27 minutes 30 seconds north latitude, 132 degrees 8 minutes 40 seconds west longitude.

(*l*) Grindall Island: Within 3,500 feet northwesterly of the eastern extremity of Approach Point.

(*m*) Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 23 minutes 30 seconds north latitude, 132 degrees 14 minutes west longitude.

(*n*) Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 22 minutes 15 seconds north latitude, 132 degrees 11 minutes 40 seconds west longitude.

(*o*) Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 15 minutes 30 seconds north latitude, 131 degrees 59 minutes 30 seconds west longitude.

(*p*) Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 8 minutes 30 seconds north latitude, 132 degrees 2 minutes west longitude.

(*q*) Polk Island: Easterly shore within 2,500 feet of a point at 55 degrees 0 minutes 45 seconds north latitude 131 degrees 58 minutes 45 seconds west longitude.

(*r*) Prince of Wales Island: Within 2,500 feet of a point at 54 degrees 57 minutes 52 seconds north latitude, 131 degrees 58 minutes 30 seconds west longitude.

(*s*) Prince of Wales Island: Within 2,500 feet of a point at 54 degrees 53 minutes 50 seconds north latitude, 131 degrees 58 minutes 30 seconds west longitude.

SOUTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—1. Regulation No. 15 (*a*) is amended to read as follows: San Juan Bautista Island: From a point on the west coast at 55 degrees 25 minutes 45 seconds north latitude southerly and easterly to a point on the south coast at 55 degrees 24 minutes north latitude, 133 degrees 18 minutes 30 seconds west longitude: *Provided*, That in 1931 no trap shall be permitted to operate south of 55 degrees 24 minutes 45 seconds north latitude. A part of these waters is in the North Prince of Wales Island district.

2. Regulation No. 15 (*c*) is amended to read as follows: Baker Island: East coast (1) within 2,500 feet of a point at 55 degrees 20 minutes 50 seconds north latitude, 133 degrees 31 minutes 32 seconds west longitude; and (2) from Point Maria to Point Capones: *Provided*, That in 1931 no trap shall be permitted to operate within 2,500 feet of the point at 55 degrees 20 minutes 50 seconds north latitude, 133 degrees 31 minutes 32 seconds west longitude.

3. Regulation No. 15 (*e*) is amended to read as follows: Prince of Wales Island: Coast from Point Providence to a point on the coast between Tranquil Point and Point Batan at 133 degrees 13 minutes west longitude: *Provided*, That in 1931 no trap shall be permitted to operate south of 55 degrees 21 minutes 50 seconds north latitude.

4. Regulation No. 15 (*f*) is amended to read as follows: Dall Island: East coast from 54 degrees 59 minutes north latitude to 55 degrees 0 minutes 30 seconds north latitude: *Provided*, That in 1931 no trap shall be permitted to operate north of 54 degrees 59 minutes 30 seconds north latitude.

5. Regulation No. 15 (*i*) is amended to read as follows: Sukkwan Island: Southwestern coast from 55 degrees 2 minutes 30 seconds north latitude to the southern extremity of the island, exclusive (a) of the coast from 55 degrees 1 minute 15 seconds north latitude to 55 degrees 0 minutes 45 seconds north latitude, and (b) exclusive of the waters of Kasook Inlet and its tributaries and branches: *Provided*, That in 1931 no trap shall be permitted to operate along the coast between the waters of Kasook Inlet and a point at 55 degrees 0 minutes 45 seconds north latitude, 132 degrees 49 minutes 30 seconds west longitude.

6. Regulation No. 15 (*j*) is amended to read as follows: Prince of Wales Island: From a point at 54 degrees 59 minutes 25 seconds north latitude, 132 degrees 36 minutes 45 seconds west longitude, southerly to a point at 54 degrees 58 minutes 50 seconds north latitude, 132 degrees 36 minutes 55 seconds west longitude, and from Point Webster southeasterly to 54 degrees 54 minutes 45 seconds north latitude, exclusive of the waters of Kassa Inlet and its tributaries and branches: *Provided*, That in 1931 no trap shall be permitted to operate between 54 degrees 56 minutes 40 seconds north latitude and 54 degrees 58 minutes 50 seconds north latitude.

7. Regulation No. 15 (*k*) is amended to read as follows: Ship Islands, Cordova Bay: West coast of the western of the two largest islands of the Ship Islands group and within 300 yards west of the southern extremity of the eastern large island of this group: *Provided*, That in 1931 no trap shall be permitted to operate along the west coast of the western of the two largest islands of the Ship Islands group.

8. Regulation No. 15 (*o*) is amended to read as follows: Prince of Wales Island: From a point near Nichols Bay at 132 degrees 5 minutes west longitude eastward and southward to Cape Chacon at 54 degrees 41 minutes 23 seconds north latitude, 132 degrees 1 minute west longitude: *Provided*, That in 1931 no trap shall operate within 5,500 feet of a point at 54 degrees 42 minutes north latitude and 132 degrees 3 minutes 33 seconds west longitude.

SOUTHERN DISTRICT

Salmon fishery.—1. Regulation No. 17 (*a*) is amended to read as follows: Cleveland Peninsula: From a point on the east side of Clarence Strait at 55 degrees 44 minutes 7 seconds north latitude, 132 degrees 15 minutes 36 seconds west longitude, southerly to Caamano Point, thence northeasterly to a point at 55 degrees 34 minutes 5 seconds north latitude near the south side of the entrance to Smugglers Cove, exclusive of the east side of Clarence Strait (1) between 132 degrees 2 minutes west longitude and 132 degrees 4 minutes west longitude, (2) between 55 degrees 33 minutes 30 seconds north latitude and 55 degrees 34 minutes 45 seconds north latitude, (3) between 55 degrees 36 minutes 10 seconds north latitude and 55 degrees 38 minutes north latitude, (4) between 55 degrees 40 minutes north latitude and 55 degrees 41 minutes 10 seconds north latitude, and (5) between 55 degrees 41 minutes 45 seconds north latitude and 55 degrees 43 minutes north latitude: *Provided*, That in 1931 no trap shall be permitted to operate (1) between 55 degrees 41 minutes 10 seconds north latitude and 55 degrees 41 minutes 45 seconds north latitude, (2) between 55 degrees 38 minutes north latitude and 55 degrees 39 minutes 30 seconds north latitude, and (3) along the shore of Bond Bay. A part of these waters is in the North Prince of Wales Island District.

2. Regulation No. 17 (*c*) is amended to read as follows: Gravina Island: West coast from South Vallenar Point to the southern extremity of Dall Head, including the Bronaugh Islands and the rocky islets adjacent to the west coast of Gravina Island south of South Vallenar Point, exclusive of coast between 55 degrees 13 minutes 15 seconds north latitude and 55 degrees 14 minutes 20 seconds north latitude, and during 1931 exclusive also of the coast between 55 degrees 11 minutes north latitude and 55 degrees 12 minutes 40 seconds north latitude.

3. Regulation No. 17 (*e*) is amended to read as follows: Gravina Island: East coast from Bostwick Point northward to Blank Point at 55 degrees 15 minutes 6 seconds north latitude, 131 degrees 40 minutes 18 seconds west longitude: *Provided*, That in 1931 no trap shall be permitted to operate along the coast herein described.

4. Regulation No. 17 (*l*) is amended to read as follows: Mainland peninsula between Smeaton Bay and Boca de Quadra: From Point Sykes at 55 degrees 11 minutes 36 seconds north latitude, 131 degrees 5 minutes 30 seconds west longitude, southerly and easterly to a point near Quadra Point at 131 degrees west longitude: *Provided*, That in 1931 no trap shall be permitted to operate (1) between 55 degrees 8 minutes north latitude and 55 degrees 9 minutes 30 seconds north latitude and (2) south of 55 degrees 6 minutes 50 seconds north latitude.

5. Regulation No. 17 (*p*) is amended to read as follows: Foggy Bay to Cape Fox: From within 1 statute mile northward and eastward of Foggy Point to the southern extremity of Cape Fox, including Cape Fox Island and the western shore of the unnamed island at 54 degrees 47 minutes 26 seconds north latitude, 130 degrees 55 minutes 10 seconds west longitude: *Provided*, That in 1931 no trap will be permitted to operate along the mainland coast between the southern extermity of Cape Fox and 130 degrees 53 minutes west longitude.

6. Regulation No. 17 (*q*) is amended to read as follows: Duke Island: East coast from a point on the north side of Ray Anchorage at 54 degrees 56 minutes 35 seconds north latitude northward to the outer extremity of Flag Point: *Provided*, That in 1931 no trap shall be permitted to operate south of 54 degrees 57 minutes 40 seconds north latitude.

7. Regulation No. 17 (*r*) is amended to read as follows: Duke Island: East coast from a point on the south shore near Kelp Island at 131 degrees 15 minutes 12 seconds west longitude northward to a point on the south side of Ray Anchorage at 131 degrees 13 minutes west longitude: *Provided*, That in 1931 no trap shall be permitted to operate between 54 degrees 53 minutes 10 seconds north latitude and 54 degrees 54 minutes 15 seconds north latitude.

8. Regulation No. 17 (*s*) is amended to read as follows: Duke Island: Southwest coast from a point on the east side of Hall Cove at 54 degrees 53 minutes 24 seconds north latitude to the southern extremity of Cape Northumberland: *Provided*, That in 1931 no trap will be permitted to operate along the coast herein described.

9. Regulation No. 17 (*x*) is amended to read as follows: Kanagunut Island: West coast between the northwestern extremity of the island and Garnet Point, and along the east coast within 2,000 feet of Garnet Point: *Provided*, That in 1931 no trap shall be permitted to operate (1) along the west coast between 54 degrees 43 minutes 58 seconds north latitude and Garnet Point, and (2) north of 54 degrees 44 minutes 20 seconds north latitude.

[*May 19, 1931*]

YUKON-KUSKOKWIM AREA

The Yukon-Kuskokwim area is hereby defined to include all territorial, coastal and tributary waters of Alaska from Cape Newenham northward to the parallel of 66 degrees north latitude.

Salmon fishery.—Subject to the limitations and prohibitions effective in the Yukon-Kuskokwim area, commercial fishing for salmon is permitted within a line from Cape Douglas to Cape York, exclusive of all waters inside a line from Point Spencer due north to the opposite shore of Seward Peninsula.

[*June 3, 1931*]

COOK INLET AREA

Salmon fishery.—1. Regulation No. 14 (*g*) is amended to read as follows: Along the mainland coast on the east side of Cook Inlet from the northern extremity of Point Possession southwesterly to a point at 60 degrees 58 minutes 22 seconds north latitude, 150 degrees 36 minutes 30 seconds west longitude, exclusive of 1 statute mile each side of the mouths of all salmon streams and exclusive of the coast within 1,000 feet of a point at 61 degrees 2 minutes north latitude, 150 degrees 24 minutes 45 seconds west longitude: *Provided*, That in 1931 no trap shall be permitted to operate (1) northerly of a point on the coast 1,000 feet southerly of a point at 61 degrees 2 minutes north latitude, 150 degrees 24 minutes 45 seconds west longitude, and (2) within 2,000 feet of a point on the coast at 60 degrees 58 minutes 55 seconds north latitude, 150 degrees 35 minutes 5 seconds west longitude.

2. Regulation No. 14 (*j*) is amended to read as follows: Along the mainland coast on the east side of Cook Inlet (1) from a point north of Boulder Point at 60 degrees 46 minutes 18 seconds north latitude, 151 degrees 15 minutes 40 seconds west longitude, southerly to a point at 60 degrees 44 minutes 1 second north latitude, 151 degrees 19 minutes 58 seconds west longitude; (2) from a point at 60 degrees 43 minutes 44 seconds north latitude, 151 degrees 22 minutes 12 seconds west longitude, southerly to a point at 60 degrees 19 minutes 39 seconds north latitude, 151 degrees 23 minutes 24 seconds west longitude, exclusive of 2½ statute miles each side of the mouth of Kenai River, 2½ statute miles each side of the mouth of Kasilof River, and 1 statute mile each side of the mouths of all other salmon streams; and (3) from a point at 60 degrees 18 minutes 48 seconds north latitude, 151 degrees 23 minutes 20 seconds west longitude, southerly to a point 2 statute miles northward from the mouth of Anchor Point River, exclusive of 2 statute miles each side of the mouth of Ninilchik River, 2 statute miles each side of the mouth of Deep Creek, 1 statute mile each side of the mouths of all other salmon streams, and exclusive of the coast within 6,000 feet of a point at 59 degrees 57 minutes 50 seconds north latitude, 151 degrees 44 minutes 17 seconds west longitude, and of the coast within ½ statute mile of a point at 59 degrees 50 minutes 10 seconds north latitude, 151 degrees 49 minutes 30 seconds west longitude: *Provided*, That in 1931 no trap shall be permitted to operate (1) within 3,500 feet northward of the point 2 statute miles northward from the mouth of Anchor Point River, (2) within 2,500 feet of a point at 59 degrees 54 minutes north latitude, 151 degrees 46 minutes 30 seconds west longitude, (3) within 2,500 feet of a point at 59 degrees 54 minutes 28 seconds north latitude, 151 degrees 46 minutes 8 seconds west longitude, (4) within 2,500 feet of a point at 60 degrees 15 minutes 47 seconds north latitude, 151 degrees 23 minutes 36 seconds west longitude, and (5) within 2,000 feet north of a point on the coast at 60 degrees 13 minutes 15 seconds north latitude.

PRINCE WILLIAM SOUND AREA

Salmon fishery.—1. Regulation No. 11 (*g*) is amended to read as follows: Along the mainland within 1 statute mile of the outer extremity of Granite Point, near Fairmont Island: *Provided*, That no trap shall be permitted to operate in 1931.

2. Regulation No. 11 (*dd*) is amended to read as follows: Western coast of Montague Island from the north side of the entrance to Hanning Bay northeasterly to 60 degrees 9 minutes 45 seconds north latitude (as shown on U. S. Coast and Geodetic Survey chart No. 8551): *Provided*, That in 1931 no trap shall be permitted to operate (1) from a point at 60 degrees 1 minute 50 seconds north latitude, 147 degrees 34 minutes 40 seconds west longitude, to a point at 60 degrees 6 minutes 6 seconds north latitude, and (2) from a point at 60 degrees 8 minutes 15 seconds north latitude to a point at 60 degrees 9 minutes 45 seconds north latitude.

SOUTHEASTERN ALASKA AREA

ICY STRAIT DISTRICT

Salmon fishery.—1. Regulation No. 16 (*b*) is amended to read as follows: Inian Islands: (1) North of 58 degrees 15 minutes 42 seconds north latitude, exclusive of the east end of the northeastern island; and (2) southwest coast of the northwestern island between 58 degrees 15 minutes 42 seconds north latitude and 58 degrees 15 minutes 18 seconds north latitude: *Provided,* That in 1931 no trap shall be operated (1) east of 136 degrees 20 minutes west longitude, and (2) north of 58 degrees 15 minutes 42 seconds north latitude on the coast of the northwesterly island.

2. Regulation No. 16 (*l*) is amended to read as follows: Mainland from a point on the east side of Excursion Inlet at 58 degrees 23 minutes north latitude southward to 135 degrees 8 minutes 40 seconds west longitude: *Provided,* That in 1931 no trap shall be permitted to operate (1) between 58 degrees 18 minutes 45 seconds north latitude and 58 degrees 16 minutes 55 seconds north latitude, and (2) north of 58 degrees 21 minutes north latitude.

3. Regulation No. 16 (*n*) is amended to read as follows: Chichagof Island: Northeastern coast from a point on the south side of Icy Strait at 135 degrees 2 minutes 40 seconds west longitude easterly to a point at 58 degrees 2 minutes 43 seconds north latitude, 134 degrees 58 minutes west longitude: *Provided,* That in 1931 no trap shall be permitted to operate east of 135 degrees west longitude.

WESTERN DISTRICT

Salmon fishery.—1. Regulation No. 19 (*d*) is amended to read as follows: Chichagof Island: Eastern coast from South Passage Point to Point Hayes, exclusive of (1) Basket Bay and within ½ statute mile of each side of its entrance, and (2) exclusive of the coast from 57 degrees 33 minutes north latitude southerly to 57 degrees 30 minutes 30 seconds north latitude: *Provided,* That in 1931 no trap shall be permitted to operate (1) south of 57 degrees 34 minutes 40 seconds north latitude exclusive of 5,000 feet north of Point Hayes, (2) between 57 degrees 36 minutes 20 seconds north latitude and 57 degrees 38 minutes 28 seconds north latitude, (3) between 57 degrees 42 minutes north latitude and 57 degrees 44 minutes 6 seconds north latitude, and (4) north of 57 degrees 44 minutes 31 seconds north latitude.

2. Regulation No. 19 (*e*) is amended to read as follows: Baranof Island: From a point ½ statute mile south of Point Thatcher to Point Lull, exclusive of the coast between 57 degrees 20 minutes 35 seconds north latitude and 57 degrees 23 minutes 30 seconds north latitude: *Provided,* That in 1931 no trap shall be permitted to operate south of 57 degrees 20 minutes north latitude.

3. Regulation No. 19 (*k*) is amended to read as follows: Admiralty Island: West coast from a point ¾ statute mile north of Parker Point to 58 degrees 2 minutes north latitude, exclusive of the coast (1) between 57 degrees 47 minutes north latitude and 57 degrees 48 minutes 30 seconds north latitude, and (2) between 57 degrees 51 minutes north latitude and 57 degrees 53 minutes 30 seconds north latitude, and during 1931 exclusive also of the coast (1) between 57 degrees 43 minutes 24 seconds north latitude and 57 degrees 46 minutes north latitude, (2) between 57 degrees 53 minutes 30 seconds north latitude and 57 degrees 54 minutes 40 seconds north latitude, and (3) between 57 degrees 55 minutes 45 seconds north latitude and 57 degrees 57 minutes 30 seconds north latitude.

4. Regulation No. 19 (*m*) is amended to read as follows: Admiralty Island: West coast from a point north of Wilson Cove at 57 degrees 10 minutes 30 seconds north latitude to Point Caution, exclusive of the coast (1) between 57 degrees 10 minutes 40 seconds north latitude and 57 degrees 11 minutes 50 seconds north latitude, and (2) between 57 degrees 13 minutes 15 seconds north latitude and 57 degrees 14 minutes 30 seconds north latitude: *Provided,* That in 1931 no trap shall be permitted to operate between 57 degrees 10 minutes 30 seconds north latitude and 57 degrees 10 minutes 40 seconds north latitude.

EASTERN DISTRICT

Salmon fishery.—1. Regulation No. 17 (*i*) is amended to read as follows: Admiralty Island: Southeast coast from Point Pybus to False Point Pybus, exclusive of coast between a point at 57 degrees 18 minutes 50 seconds north latitude and a point at 57 degrees 20 minutes north latitude, 133 degrees 55 minutes west longitude: *Provided,* That in 1931 no trap shall be operated between Point Pybus and a point at 57 degrees 18 minutes 50 seconds north latitude.

2. Regulation No. 17 (*n*) is amended to read as follows: Kuiu Island: Northwest coast from a point 1 statute mile north of the north side of the entrance to Washington Bay northward to the point at the east side of the entrance to Band Cove: *Provided,* That in 1931 no trap shall be permitted to operate (1) between 56 degrees 45 minutes 50 seconds north latitude and 56 degrees 47 minutes 50 seconds north latitude, and (2) between 56 degrees 49 minutes 30 seconds north latitude, 134 degrees 25 minutes west longitude, and 56 degrees 51 minutes 30 seconds north latitude, 134 degrees 24 minutes 40 seconds west longitude.

NORTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—1. Regulation No. 17 (*y*) is amended to read as follows: Etolin Island: West coast from 56 degrees 18 minutes north latitude southward to Steamer Point, exclusive of the coast between 132 degrees 38 minutes west longitude and 56 degrees 15 minutes north latitude: *Provided,* That in 1931 no trap shall be permitted to operate (1) north of 56 degrees 15 minutes 15 seconds north latitude, and (2) along the coast between Steamer Point Light and 132 degrees 38 minutes west longitude.

2. Regulation No. 17 (*bb*) is amended to read as follows: Etolin Island: West coast from 56 degrees 4 minutes 30 seconds north latitude southeasterly to 56 degrees 3 minutes north latitude, 132 degrees 38 minutes 54 seconds west longitude: *Provided,* That in 1931 no trap shall be permitted to operate on the west coast of Etolin Island between 56 degrees 3 minutes north latitude and 56 degrees 3 minutes 30 seconds north latitude.

3. Regulation No. 17 (*cc*) is amended to read as follows: West coast of Observation Island, Marsh Island, Screen Islands, and Abraham Island: *Provided,* That in 1931 no trap shall be permitted to operate on the coast of Abraham Island and Screen Islands.

4. Regulation No. 17 (*dd*) is amended to read as follows: East Island: East coast within 2,500 feet of a point at 56 degrees 10 minutes north latitude, 132 degrees 54 minutes 16 seconds west longitude: *Provided,* That no trap shall be permitted to operate in 1931.

5. Regulation No. 17 (*ll*) is amended to read as follows: Cleveland Peninsula: West coast from ½ statute mile east of Watkins Point southward to a point 1 statute mile north of Emerald Bay: *Provided,* That in 1931 no trap shall be permitted to operate between 55 degrees 54 minutes 30 seconds north latitude and 55 degrees 57 minutes 15 seconds north latitude.

6. Regulation No. 17 (*zz*) is amended to read as follows: Prince of Wales Island: East coast from McLean Point to a point 3,500 feet southward: *Provided,* That no trap shall be permitted to operate in 1931.

7. Regulation No. 17 (*aaa*) is amended to read as follows: Prince of Wales Island: From a point on Cape Chacon at 54 degrees 41 minutes 23 seconds north latitude, 132 degrees 1 minute west longitude, northerly to a point at approximately 54 degrees 45 minutes north latitude, 132 degrees west longitude: *Provided,* That in 1931 no trap shall operate except within 2,500 feet of a point at 54 degrees 43 minutes 5 seconds north latitude, 132 degrees 0 minutes 54 seconds west longitude.

8. That part of regulation No. 15 in supplement No. 251–17–2 issued March 17, 1931, giving the location of a place ½ statute mile northwest of Luck Point at 55 degrees 52 minutes 25 seconds north latitude is hereby amended to make the location of such place at 55 degrees 59 minutes 25 seconds north latitude.

9. Regulation No. 15 (*a*), in Supplement No. 251–17–2, is amended to read as follows: Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 57 minutes north latitude, 132 degrees 41 minutes 59 seconds west longitude: *Provided,* That no trap shall be permitted to operate in 1931.

10. Regulation No. 15 (*c*), in Supplement No. 251–17–2, is amended to read as follows: Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 54 minutes 28 seconds north latitude, 132 degrees 36 minutes 59 seconds west longitude: *Provided,* That no trap shall be permitted to operate in 1931.

11. Regulation No. 15 (*e*), in Supplement No. 251–17–2, is amended to read as follows: Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 47 minutes 50 seconds north latitude, 132 degrees 29 minutes west longitude: *Provided,* That no trap shall be permitted to operate in 1931.

12. Regulation No. 15 (*g*), in Supplement No. 251–17–2, is amended to read as follows: Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 36 minutes 25 seconds north latitude, 132 degrees 20 minutes 47 seconds west longitude: *Provided,* That no trap will be permitted to operate in 1931.

13. Regulation No. 15 (*h*), in Supplement No. 251–17–2, is amended to read as follows: Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 34 minutes 2 seconds north latitude, 132 degrees 18 minutes 42 seconds west longitude: *Provided*, That no trap will be permitted to operate in 1931.

14. Regulation No. 15 (*n*), in Supplement No. 251–17–2, is amended to read as follows: Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 22 minutes 15 seconds north latitude, 132 degrees 11 minutes 40 seconds west longitude: *Provided*, That no trap shall be permitted to operate in 1931.

15. Regulation No. 15 (*p*), in Supplement No. 251–17–2, is amended to read as follows: Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 8 minutes 30 seconds north latitude, 132 degrees 2 minutes west longitude: *Provided*, That no trap shall be permitted to operate in 1931.

16. Regulation No. 15 (*s*), in Supplement No. 251–17–2, is amended to read as follows: Prince of Wales Island: Within 2,500 feet of a point at 54 degrees 53 minutes 50 seconds north latitude, 131 degrees 58 minutes 30 seconds west longitude: *Provided*, That no trap shall be permitted to operate in 1931.

SOUTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—1. Regulation No. 15 (*h*) is amended to read as follows: Long Island, east of Dall Island: East and west coasts within 2,500 feet measured along the coast from 54 degrees 46 minutes 15 seconds north latitude: *Provided*, That in 1931 no trap shall be permitted to operate on the east coast of Long Island.

2. Regulation No. 15 (*m*) is amended to read as follows: Prince of Wales Island: South coast within 1,500 feet northeasterly from the extremity of land at 54 degrees 43 minutes 5 seconds north latitude, 132 degrees 13 minutes 35 seconds west longitude: *Provided*, That no trap shall be permitted to operate in 1931.

SOUTHERN DISTRICT

Salmon fishery.—1. Regulation No. 17 (*a*) is amended to read as follows: Cleveland Peninsula: From a point on the east side of Clarence Strait at 55 degrees 44 minutes 7 seconds north latitude, 132 degrees 15 minutes 36 seconds west longitude, southerly to Caamano Point, thence northeasterly to a point at 55 degrees 34 minutes 5 seconds north latitude near the south side of the entrance to Smugglers Cove, exclusive of the east side of Clarence Strait (1) between 132 degrees 2 minutes west longitude and 132 degrees 4 minutes west longitude, (2) between 55 degrees 33 minutes 30 seconds north latitude and 55 degrees 34 minutes 45 seconds north latitude, (3) between 55 degrees 36 minutes 10 seconds north latitude and 55 degrees 38 minutes north latitude, (4) between 55 degrees 40 minutes north latitude and 55 degrees 41 minutes 10 seconds north latitude, and (5) between 55 degrees 41 minutes 45 seconds north latitude and 55 degrees 43 minutes north latitude: *Provided*, That in 1931 no trap shall be permitted to operate (1) between 55 degrees 41 minutes 10 seconds north latitude and 55 degrees 41 minutes 45 seconds north latitude, (2) between 55 degrees 38 minutes north latitude and 55 degrees 39 minutes 30 seconds north latitude, (3) along the shore of Bond Bay, and (4) within 2,500 feet of a point at 55 degrees 31 minutes 40 seconds north latitude, 131 degrees 56 minutes 23 seconds west longitude. A part of these waters is in the North Prince of Wales Island District.

2. Regulation No. 17 (*i*) is amended to read as follows: Revillagigedo Island: From Cone Point southeasterly to a point at 55 degrees 11 minutes 36 seconds north latitude, 131 degrees 10 minutes 42 seconds west longitude, including Cone Island: *Provided*, That in 1931 no trap shall be permitted to operate within 2,500 feet of a point at 55 degrees 11 minutes 30 seconds north latitude, 131 degrees 12 minutes 30 seconds west longitude.

3. Regulation No. 17 (*j*) is amended to read as follows: Revillagigedo Island: Within ½ statute mile of Escape Point, within 5,000 feet northwesterly of Indian Point, and within 1⅛ statute miles northeasterly from a point north of Point Higgins at 55 degrees 27 minutes 45 seconds north latitude, 131 degrees 49 minutes 58 seconds west longitude: *Provided*, That in 1931 no trap shall be operated within 5,000 feet northwesterly of Indian Point.

4. Regulation No. 17 (*n*) is amended to read as follows: Mainland south of Boca de Quadra: Within ⅛ statute mile of a point on Kah Shakes Point at 55 degrees 3 minutes 44 seconds north latitude, 130 degrees 59 minutes 30 seconds west longitude: *Provided*, That no trap shall be permitted to operate in 1931.

5. Regulation No. 17 (*v*) is amended to read as follows: East Island, east of Kelp Island: Eastern coast between the northern and southern extremities of the island: *Provided*, That no trap shall be permitted to operate in 1931.

6. Regulation No. 17 (*x*) is amended to read as follows: Kanagunut Island: West coast between the northwestern extremity of the island and Garnet Point, and along the east coast within 2,000 feet of Garnet Point: *Provided*, That in 1931 no trap shall be permitted to operate (1) along the west coast between 54 degrees 43 minutes 58 seconds north latitude and Garnet Point, (2) north of 54 degrees 44 minutes 20 seconds north latitude, and (3) on the east coast of Kanagunut Island within 2,000 feet of Garnet Point.

[*June 5, 1931*]

Yukon-Kuskokwim Area

Salmon fishery.—Commercial fishing for salmon is permitted within a line from Cape Douglas to Cape York, exclusive of all waters east of 166 degrees 28 minutes west longitude.

Prince William Sound Area

Herring fishery.—Commercial fishing for herring, except for bait purposes, is prohibited from 12 o'clock noon of Saturday of each week until 12 o'clock noon of the Monday following.

[*June 29, 1931*]

Cook Inlet Area

Salmon fishery.—Regulation No. 14 (*j*) is amended to read as follows: Along the mainland coast on the east side of Cook Inlet (1) from a point north of Boulder Point at 60 degrees 46 minutes 18 seconds north latitude, 151 degrees 15 minutes 40 seconds west longitude, southerly to a point at 60 degrees 44 minutes 1 second north latitude, 151 degrees 19 minutes 58 seconds west longitude; (2) from a point at 60 degrees 43 minutes 44 seconds north latitude, 151 degrees 22 minutes 12 seconds west longitude, southerly to a point at 60 degrees 19 minutes 39 seconds north latitude, 151 degrees 23 minutes 24 seconds west longitude, exclusive of 2½ statute miles each side of the mouth of Kenai River, 2½ statute miles each side of the mouth of Kasilof River, and 1 statute mile each side of the mouths of all other salmon streams; and (3) from a point at 60 degrees 18 minutes 48 seconds north latitude, 151 degrees 23 minutes 20 seconds west longitude, southerly to a point 2 statute miles northward from the mouth of Anchor Point River, exclusive of 2 statute miles each side of the mouth of Ninilchik River, 2 statute miles each side of the mouth of Deep Creek, 1 statute mile each side of the mouths of all other salmon streams, and exclusive of the coast within 6,000 feet of a point at 59 degrees 57 minutes 50 seconds north latitude, 151 degrees 44 minutes 17 seconds west longitude, and of the coast within ½ statute mile of a point at 59 degrees 50 minutes 10 seconds north latitude, 151 degrees 49 minutes 30 seconds west longitude: *Provided*, That in 1931 no trap shall be permitted to operate (1) within 3,500 feet northward of the point 2 statute miles northward from the mouth of Anchor Point River, (2) within 2,500 feet of a point at 59 degrees 54 minutes north latitude, 151 degrees 46 minutes 30 seconds west longitude, (3) within 2,500 feet of a point at 59 degrees 54 minutes 28 seconds north latitude, 151 degrees 46 minutes 8 seconds west longitude, (4) within 2,500 feet of a point at 60 degrees 15 minutes 9 seconds north latitude, 151 degrees 23 minutes 50 seconds west longitude, and (5) within 2,000 feet north of a point on the coast at 60 degrees 13 minutes 15 seconds north latitude.

Prince William Sound Area

Salmon fishery.—Regulation No. 11 (*o*), opening the west coast of Goose Island between its northern and southern extremities to trap fishing, is hereby revoked.

Southeastern Alaska Area

ICY STRAIT DISTRICT

Salmon fishery.—Regulation No. 16 (*l*) is amended to read as follows: Mainland from a point on the east side of Excursion Inlet at 58 degrees 23 minutes north latitude southward to 135 degrees 8 minutes 40 seconds west longitude: *Provided*, That in 1931 no trap shall be permitted to operate (1) between 58 degrees 18 minutes 45 seconds north latitude and 58 degrees 16 minutes 55 seconds north latitude, and (2) north of 58 degrees 21 minutes 45 seconds north latitude.

NORTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—1. Regulation No. 17 (*cc*) is amended to read as follows: West coast of Observation Island, Screen Islands, and Abraham Island: *Provided*, That in 1931 no trap shall be permitted to operate on the coast of Abraham Island and the southern island of the Screen Islands group.

2. Regulation No. 15 (*k*), in Supplement No. 251–17–2, is amended to read as follows: Prince of Wales Island: Within 2,500 feet of a point at 55 degrees 27 minutes 30 seconds north latitude, 132 degrees 8 minutes 40 seconds west longitude: *Provided*, That no trap shall be permitted to operate in 1931.

[*July 6, 1931*]

COOK INLET AREA

Salmon fishery.—All commercial fishing for salmon is prohibited in Kamishak Bay and its tributary waters west of 154 degrees west longitude.

[*July 8, 1931*]

KODIAK AREA

Salmon fishery.—1. Regulation No. 18 (*e*) is amended to read as follows: Kodiak Island: Coast from a point on Kupreanof Strait at 152 degrees 58 minutes 12 seconds west longitude westward to a point at 57 degrees 56 minutes 30 seconds north latitude, 153 degrees 0 minutes 22 seconds west longitude: *Provided*, That no trap shall be permitted to operate in 1931.

2. Regulation No. 18 (*f*) is amended to read as follows: Kodiak Island: Within 2,500 feet of a point on the coast on the south side of Kupreanof Strait at 57 degrees 57 minutes 46 seconds north latitude, 153 degrees 9 minutes 37 seconds west longitude: *Provided*, That no trap shall be permitted to operate in 1931.

[*July 14, 1931*]

BRISTOL BAY AREA

Salmon fishery.—1. Commercial fishing for salmon in the Nushagak district is prohibited from 6 o'clock antemeridian July 15 to 6 o'clock antemeridian August 3.

2. Regulation No. 14 is amended to read as follows: The 36-hour weekly closed period for salmon fishing prescribed by section 5 of the act of June 6, 1924, is hereby extended to include the period from 6 o'clock antemeridian Wednesday to 6 o'clock antemeridian Thursday of each week, making a weekly closed period of 60 hours: *Provided*, That in the Kvichak-Naknek district the weekly closed period shall extend from 6 o'clock antemeridian Wednesday to 6 o'clock postmeridian Thursday and from 6 o'clock postmeridian Saturday to 6 o'clock postmeridian of the Monday following, making a weekly closed period of 84 hours; *Provided further*, That in the waters of Kvichak Bay between the line extending across the bay from the marker on a high point on the east bank of Prosper Creek, about 700 yards above the Koggiung cannery of the Alaska Packers Association, to the marker on the opposite side, the course being about north, 44 degrees west, magnetic, and the line extending at right angles across the bay from a marker at Jensen Creek to a marker on the opposite shore about 1½ miles west of Squaw Creek, the 36-hour weekly closed period for salmon fishing prescribed by section 5 of the act of June 6, 1924, is hereby extended to include the period from 6 o'clock postmeridian of Saturday of each week to 12 o'clock noon of the Tuesday following, and the period from 6 o'clock postmeridian Wednesday to 12 o'clock midnight Thursday of each week, making a weekly closed period of 96 hours.

PRINCE WILLIAM SOUND AREA

Clam fishery.—Regulation No. 2 is amended to read as follows: The taking of clams for commercial purposes is prohibited after July 31 in each calendar year.

COPPER RIVER AREA

Clam fishery.—Regulation No. 2 is amended to read as follows: The taking of clams for commercial purposes is prohibited after July 31 in each calendar year.

[*July 16, 1931*]

BRISTOL BAY AREA

Salmon fishery.—Commercial fishing for salmon in all districts is prohibited in the period from 6 o'clock antemeridian July 22 to 6 o'clock antemeridian August 3.

[*July 24, 1931*]

YUKON-KUSKOKWIM AREA

Salmon fishery.—Regulation No. 6 is amended to read as follows: Commercial fishing for salmon is prohibited except in the period from 6 o'clock antemeridian June 5 to 6 o'clock postmeridian July 31, and in the period from 6 o'clock antemeridian August 3 to 6 o'clock postmeridian August 15 in each year.

[*July 31, 1931*]

SOUTHEASTERN ALASKA AREA

NORTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—Regulation No. 17 (*ll*) is amended to read as follows: Cleveland Peninsula: West coast from ½ statute mile east of Watkins Point southward to a point 1 statute mile north of Emerald Bay: *Provided*, That in 1931 no trap shall be permitted to operate between 55 degrees 55 minutes 15 seconds north latitude and 55 degrees 57 minutes 15 seconds north latitude.

[*August 1, 1931*]

PRINCE WILLIAM SOUND AREA

Salmon fishery.—Regulation No. 9 is amended to read as follows: Commercial fishing for salmon is prohibited during the remainder of each calendar year after 6 o'clock antemeridian August 5: *Provided*, That this prohibition shall not apply (*a*) to trolling and gill netting through August 15 in the waters along the western coast from the outer point on the north shore of Granite Bay (known as Granite Bay Point) to the light on the south shore of the entrance to Port Nellie Juan, nor (*b*) to trolling in the period from 6 o'clock antemeridian August 5 to 6 o'clock postmeridian September 20 in the waters of Prince William Sound east of 147 degrees west longitude, exclusive of all waters of Valdez Arm north of Point Freemantle. All trap leads from shore to entrance of hearts must be removed prior to 6 o'clock antemeridian August 9.

SOUTHEASTERN ALASKA AREA

ICY STRAIT AND WESTERN DISTRICTS

Herring fishery.—Fishing for herring for bait is permitted in the waters of Port Frederick, Chichagof Island, from 6 o'clock antemeridian August 3 to 6 o'clock antemeridian August 7.

[*August 17, 1931*]

SOUTHEASTERN ALASKA AREA

Herring fishery.—Regulation No. 4 is amended so as to permit fishing for herring for bait in the waters of Pybus Bay and Seymour Canal from 6 o'clock antemeridian August 18 to 6 o'clock antemeridian August 21.

[*August 18, 1931*]

SOUTHEASTERN ALASKA AREA

ICY STRAIT, WESTERN, EASTERN, NORTH PRINCE OF WALES ISLAND, SOUTH PRINCE OF WALES ISLAND, AND SOUTHERN DISTRICTS

Salmon fishery.—The regulation prohibiting commercial fishing for salmon by trolling from 6 o'clock antemeridian August 25 to 6 o'clock postmeridian September 20 is hereby revoked.

[*August 21, 1931*]

SOUTHEASTERN ALASKA AREA

SOUTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—Regulation No. 6 is amended to read as follows: Commercial fishing for salmon, other than trolling, is prohibited prior to 6 o'clock antemeridian July 15 in each calendar year, from 6 o'clock postmeridian August 28 to 6 o'clock antemeridian October 1 in each year, and for the remainder of each calendar year after 6 o'clock postmeridian October 15.

[*September 4, 1931*]

SOUTHEASTERN ALASKA AREA

Herring fishery.—Fishing for herring for bait in the waters of Wrangell Narrows and the placing of pounds for herring for bait in Scow Bay are permitted for thirty days beginning September 4 and ending at the close of October 3, 1931.

Revised regulations covering the fisheries of Alaska were issued by the Secretary of Commerce under date of December 17, 1931, copies of which may be secured, without cost, on application to the Bureau of Fisheries, Washington, D. C.

ANNETTE ISLAND FISHERY RESERVE

The Annette Island Packing Co. again operated in the Annette Island Fishery Reserve under its lease from the Department of the Interior.

In 1931 the company operated six traps within the reservation, the catch of which totaled 261,993 salmon; and 2,043 salmon taken in purse seines and gill nets within the reserve were purchased from natives. In addition, 159,198 salmon taken outside the reserve and purchased from natives and other independent operators of seines, gill nets, and traps were packed at the cannery. In the operation of the plant and the fish traps, employment was given to 15 whites and 186 natives.

STREAM IMPROVEMENT

In connection with the patrol of fishing areas the work of improving and enlarging salmon spawning areas was continued in 1931. Log jams and bowlders were removed from a number of streams, the most noteworthy instance being the improvement of the falls in Karta River, which in the past have hindered the ascent of salmon during dry seasons. A number of large bowlders were removed with dynamite, making a clear passage to the head of the falls through which the salmon passed without effort. Repairs were made to the Ketchikan Creek fishway, which was damaged by débris carried down on the flood waters in the fall of 1930. It was found necessary to build a wing dam above the fishway to maintain a uniform flow of water. Further permanent improvements in this structure are anticipated prior to the spawning migration of 1932.

An inspection of conditions on Anan Creek was made by U. B. Gilroy in July, 1931, with a view to facilitating the ascent of salmon above the second falls. A detailed report with recommendations for improving conditions was submitted, and it is anticipated that the necessary improvements will be made during the low-water period of 1932.

Other improvements consisted in the removal of log jams and débris from Eagle Creek and the stream entering Whale Passage and improvement of the falls in Olive Cove in southeastern Alaska, and in

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clearing jams from Quartz Creek, Lost Creek, and Chinik Creek in the Cook Inlet region.

STREAM MARKING

New markers defining areas closed to commercial fishing were erected to replace those which had become illegible or damaged, and changes were made in the positions of others to conform with changes made in the regulations with respect to closed areas.

STREAM GUARDS

The bureau employed 220 men in 1931 as stream guards and special workmen in connection with law-enforcement duties. Of these, 110 were stationed in southeastern Alaska, 71 in central, and 39 in western Alaska. Some of the temporary workers were engaged for only a few days, but the period of employment generally ranged from two to five months.

In southeastern Alaska 54 stream watchmen furnished their own launches and were assigned to patrol larger bodies of water or in the vicinity of several streams.

In central Alaska 19 guards were stationed in the Seward-Katalla district, 10 on Cook Inlet, 30 in the Kodiak-Afognak district, 4 at Chignik, and 8 in the Ikatan-Shumagin district. Twelve of these guards, most of whom were in the Seward-Katalla district, provided their own launches.

In western Alaska 36 were on Bristol Bay; and 3, of whom 1 furnished his own boat, were in the Yukon-Kuskokwim district.

There were also 15 special employees engaged in scientific work—3 on herring and 12 on salmon investigations, this work being carried on chiefly in southeastern and central Alaska.

In addition, there were 12 statutory employees, 53 men on the bureau's vessels, and 12 on the 9 chartered boats.

The foregoing makes a grand total of 312 persons identified with fishery-protective work in Alaska in 1931, as compared with 317 in 1930.

VESSEL PATROL

The bureau maintained a fleet of 15 vessels in Alaska for fishery patrol work in 1931. These vessels were assigned to duty as follows: The *Widgeon*, *Murre*, *Auklet*, and *Petrel* in southeastern Alaska throughout the season; the *Blue Wing* and *Red Wing* in the Kodiak area, where the latter also served as tender for the Afognak hatchery; the *Ibis* in the Chignik area; the *Merganser* in the Ikatan-Shumagin region; and the *Coot* on the Yukon River. The *Scoter*, *Teal*, and *Kittiwake*, which were on patrol duty in Bristol Bay, Cook Inlet, and Prince William Sound, respectively, during the fishing seasons in those localities, augmented the patrol in southeastern Alaska in the fall. The *Crane* and the *Eider* also operated in southeastern Alaska during the fall after their return from duty to the westward, where the former had patrolled in the Alaska Peninsula area for part of the season, while the latter had served both in that region and in the Kodiak area. The *Brant* was used in general supervisory work in southeastern Alaska. The Pribilof Islands tender *Penguin* was used by the commissioner in the inspection of fishery operations in southeastern, central, and western Alaska for a number of weeks, during which period the *Crane* was detailed to the Pribilofs.

In addition to the vessels owned by the Bureau of Fisheries, nine boats were chartered for patrolling fishing areas. The following chartered boats were used: *Bear*, *Chirikov*, *Helen Hinton*, *Lady Luck*, and *Valkyrie* in southeastern Alaska; *Katherine L* and *Prospector* on Copper River and Prince William Sound; *Coyote* in Cook Inlet; and *Auk* at Port Moller.

AERIAL PATROL

The curtailment of commercial fisheries operations, the abundance of salmon in areas open to commercial fishing, and the consequent lack of incentive for violating the fishery regulations made it unnecessary to maintain the aerial patrol to the same extent as in the preceding year. Flights were made in connection with general supervisory work, and for the purpose of observing spawning grounds, chiefly in the Bristol Bay region. In one instance a plane was used to place a number of employees in an isolated district.

COMPLAINTS AND PROSECUTIONS

In southeast Alaska three seine boats were seized for illegal fishing in closed waters during the 1931 season. The case against the master and two others aboard the *Estrella*, found fishing in Ward Cove on July 18, was tried before the United States commissioner at Ketchikan and a fine of $50 was imposed, the sentence being suspended until August 17 to allow them time to secure the necessary funds. The masters of the *Reliance* and *Klawack No. 7*, who were arrested on July 29 for fishing inside the markers at Mole Harbor, pleaded guilty before the commissioner at Juneau and paid fines of $125 each.

Masters of the trolling boats *Ace* and *J. Warren*, charged with illegal fishing during weekly closed periods in July, pleaded guilty before the commissioner at Juneau and were fined $100 and $50, respectively. A suspended sentence was given in the latter case, and the fine was paid on September 19. Two gill-net fishermen were arrested for fishing in Ahrnklin Inlet with set gill nets in excess of the specified maximum length and were fined $50 each by the local commissioner. Five herring seine boats—*Lorenz*, *Clermont*, *Tatoosh*, *Teresa S*, and *Edgar C*—were found fishing with seines less than 100 yards from other seines already set for fishing, in violation of section 3 of the act of June 6, 1924. The masters appeared before the commissioner at Juneau, pleaded guilty, and were fined $75 in the case of the *Teresa S*, and $100 in each of the others.

In the southeastern district, also, seizures were made of illegal fishing gear as follows: 50 fathoms of gill net from the trolling boat *Harry Nelson*, a 75-fathom purse seine from the *Iona T–4068*, and small pieces of seine web and gill net from the halibut boat *Schorn*. No fines were imposed, as the gear was not in use at the time the seizures were made and voluntary releases were signed by the owners.

Eleven cases involving violations of the fisheries laws and regulations by 18 individuals were brought before the United States commissioner at Cordova. These included two cases, each against two men and having to do with infringement of the regulations regarding weekly closed periods, that were dismissed because of insufficient evidence. In all other cases, the defendants pleaded guilty as charged and fines were imposed. Seven fishermen in the Copper River area, arrested during the month of June for the use of anchored gill nets, were assessed fines ranging from $50 to $150 and totaling $550. Another fisherman in this area was apprehended for fishing with a stake net on June 25 in closed waters of King Salmon Slough and was fined $25 on each of two counts. Three salmon fishermen, arrested for fishing in a closed area in Cochrane Bay, one who was found fishing during a weekly closed period in Main Bay, and two clam diggers who took undersized clams were fined $25 each. The salmon and clams which were taken illegally in the Prince William Sound area were sold for $75.90 and $3.20, respectively, and the proceeds were turned over to the Department of Justice.

In the Cook Inlet area four cases were tried before local commissioners, the defendants pleaded guilty, and fines were imposed. These included cases against two men for fishing during weekly closed periods, in one of which a fine of $25 was imposed and paid, and in the other a fine of $50 was assessed, but the defendant refused to pay and was ordered to jail for 25 days. One case against three fishermen who used a beach seine inside markers at the mouth of Seldovia River resulted in a joint fine of $250, which was later reduced to $200 and paid. A fur farmer, charged with willfully and unlawfully maintaining a dam and trap in Cottonwood Creek in violation of section 3 of the act of June 6, 1924, was fined $100.

An anchored gill net considerably in excess of the maximum length permitted, found about 1 mile south of the mouth of Nikolai River, and two set gill nets less than the required distance apart at East Foreland were seized and are being held for condemnation proceedings.

A gill net set for fishing at Twocone Point, Kodiak Island, during a weekly closed period was seized on June 14, and 28 red salmon therein were sold for $6.30. Later the owner was apprehended and taken before the commissioner at Kodiak, where he pleaded guilty and was placed in jail, being unable to pay the fine of $250 which was imposed. O. L. Grimes and 24 Indians under his direction were arrested for fishing near Buskin River during a closed period on August 15. All pleaded guilty before the commissioner at Kodiak, who imposed fines of $250 on the cannery operator and $15 on each of the Indians. A set gill net, found illegally fishing on the evening of September 6 in Uganik Bay, was seized and stored in the bureau's warehouse subject to order of the court. A few salmon taken from it were sold, and the receipts turned over to the commissioner at Kodiak.

Charges of wanton waste of herring were brought against the Kalgin Packing Co. for impounding herring at Akutan and leaving them until they were unfit for use. The company, through its superintendent, pleaded guilty before the commissioner at Unalaska and was fined $500.

In the Bristol Bay area two men (stowaways on the *Otsego* from Seattle) were arrested for fishing for the Bristol Bay Packing Co. during a closed season. They pleaded guilty before the commissioner at Naknek and were fined $25 each, upon payment of which the boat and gear were released to the company.

TERRITORIAL FISHERY LEGISLATION

During the 1931 session of the Alaska Legislature five bills were passed which have reference to the fisheries of Alaska. Two of these made appropriations for the destruction of hair seals, which in certain localities are considered as predatory enemies of the salmon and other valuable fishes.

An act approved April 30, 1931, appropriated $25,000 to be expended in improving salmon spawning grounds and destroying predatory enemies of the salmon, under the direction of the Governor of Alaska in cooperation with the Bureau of Fisheries.

Other acts provided for the stocking of lakes and streams in certain parts of Alaska with game fish, including an appropriation of $500 for that purpose, and provided for the bonding of any company or individual applying for a provisional license for prosecuting certain fishery industries where the applicant does not have sufficient real property in the Territory to secure the payment of taxes on such industries.

The Territorial act of May 2, 1929, imposing a license fee of $250 on nonresident troll fishermen and $1 on resident fishermen, was held by the Circuit Court of Appeals for the Ninth Circuit to be in conflict with provisions of the Federal law wherein it is stipulated that no citizen of the United States shall be denied the right to take fish in any area of the waters of Alaska where fishing is permitted by the Secretary of Commerce. That court on November 24, 1930, reversed the decree of the Federal district court in the case of Wood Freeman, president of the Trolling Vessel Owners Association, *v.* the Territory of Alaska, a test case to decide the constitutionality of the act, with instructions to overrule the demurrer and for further proceedings not inconsistent with the opinion of the appellate court. The case was reopened in the United States district court at Juneau, with presentation of arguments on both sides in July, but no decision had been rendered at the close of the year.

TERRITORIAL LICENSE TAX

Fisheries license taxes were collected by the Territory under the general revenue law of 1921, as amended in 1923, 1925, and 1927. A statement from W. G. Smith, Territorial treasurer, under date of May 2, 1932, gives the collections made to that date for the year 1931. It was stated that collections under the several schedules were fairly complete, although a considerable number of the smaller fisheries companies had not yet made settlement. The outstanding salmon pack taxes, including some gear taxes, amounted to approximately $35,000; while about $2,700 was still to be collected on fish oil and fertilizer.

Fishery license taxes collected by Territory for fiscal year ended December 31, 1931

Schedule	Division No. 1	Division No. 2	Division No. 3	Total
Salmon canneries (pack)	$157,795.86		$307,406.37	$465,202.23
Clam canneries	56.19		194.51	250.70
Salteries	1,826.35	$42.46	1,178.58	3,047.39
Cold-storage plants	700.00		125.00	825.00
Fresh-fish dealers	1,472.45		7.00	1,479.45
Fish-oil works and fertilizer and fish-meal plants	15,443.85		2,189.16	17,633.01
Fish traps	72,961.55		48,209.49	121,171.04
Gill nets	510.00	33.00	4,593.42	5,136.42
Seines	3,665.00		2,135.00	5,800.00
Total	254,431.25	75.46	366,038.53	620,545.24
Salmon canneries (net income), not possible of segregation as to judicial division				3,213.73
Total collections				623,758.97

BRISTOL BAY DISTRICT

The bureau's activities in the Bristol Bay district were continued along the same general lines as in previous years. Agent Dennis Winn again organized the work and supervised it throughout the season, assisted by Wardens Eric D. Fenno and Fred R. Lucas. In addition, 36 temporary employees made up the field crew at Bristol Bay in 1931. Of these, 29 were employed in Seattle and vicinity, 3 had been on duty in the district throughout the previous winter, and 4 were employed locally.

Twenty-six of the Bristol Bay force sailed from Seattle on vessels of the bureau, as follows: 4 on the *Eider*, which left on April 23; 15 on the *Crane;* and 7, including Warden Lucas, on the *Scoter*, both of which sailed north on April 28. The two last-named vessels reached False Pass on May 10, where they were storm bound for two days. On May 12 they took aboard the 4 men who had come north on the *Eider* and continued the journey to Naknek, arriving there on May 15. Two employees were transported to Bristol Bay on a vessel belonging to Libby, McNeill & Libby which sailed from Seattle on May 13; 1, with Agent Dennis Winn, sailed from Portland on May 15 on a vessel of the Pacific American Fisheries; and 1 left Seattle June 1 on a commercial freighter.

Part of the season's supplies was carried on the bureau's vessels; but the heavier shipments, including approximately 125,000 feet of lumber, were sent north on cannery freighters.

At the end of the season 7 men returned to Seattle on the *Victoria*, leaving Bristol Bay the latter part of July; 6 left on the *Scoter*, and 17 on the *Crane*, sailing on August 28. Those on the *Scoter* transferred to a commercial steamer at Ketchikan, as the *Scoter* was assigned to patrol in southeastern Alaska during the fall season. The *Crane* transported all of its passengers to Seattle except one who left at Seward and one at Wrangell.

Agent Dennis Winn left Naknek on August 6, crossing the portage to Iliamna Bay, where he boarded the *Teal* for passage to Seward, whence he traveled by airplane to Cordova. He returned to the Bristol Bay district later to make an aerial survey of the spawning grounds.

Warden Lucas, who fell and fractured his left shoulder blade on August 25, was transported by airplane to the Government hospital at Anchorage, where he remained until September 18, on which date he left for Seward, sailing thence for southeastern Alaska on the S. S. *Yukon*.

Warden Fenno again remained in the Nushagak district over winter to supervise the destruction of trout and the payment of Territorial bounties therefor. William E. Sullivan and C. M. Hatton were assigned to similar work at Becharof Lake and Iliamna Lake, respectively, and Alf. Christensen was stationed as winter watchman of the bureau's property at the marine ways at Naknek.

Mr. Lucas's report on operations during the season is as follows:

GENERAL REPORT OF SEASON'S OPERATIONS

Before the arrival of the crew from the States, Warden Fenno and the winter watchman at the marine ways had painted nearly all of the bureau's boats and scows. Most of the field crew arrived on May 15 on the *Crane* and *Scoter*, and the work of overhauling and preparing the boats for launching was begun immediately. Besides the necessary work on the hulls, each engine of the eight launches, as well as of the two power skiffs, was overhauled and adjusted. Supplies and materials brought north on the cannery ships were lightered ashore, and the material was sorted and made ready for transshipment to the various weirs. Work at the weirs was then begun, the installation of the Naknek weir being undertaken first, the crew for which left for the weir camp on June 1.

PATROL

The *Scoter*, eight small boats, and two power skiffs comprised the patrol fleet for the district. The *Scoter* was used by Agent Winn in general supervision of the entire area, while the small boats traversed specified localities, checking gear to assure compliance with regulations, and collecting data on commercial operations. These boats were assigned to the various sections of Bristol Bay, as follows:

Ugashik River and Bay.—Launch *No. 6*, C. M. Hatton and William K. Leise. Launch *No. 8*, Henry McFadden and Stanley C. Tholo, also patrolled in this locality and was used as a tender in connection with Ugashik weir operations.

Egegik River.—Launch *No. 4*, Elmer Quistorff and Ralph Overbay.

Naknek River.—Launch *No. 2*, Clinton Gross and Claude Bushey.

Kvichak Bay and River.—Launch *No. 9*, Alf. Christensen and Oscar Thorene; launch *No. 1*, George I. Adams and Jack Burns, assigned to patrol the upper reaches of the bay and to see that no fishing was done above the limit line; launch *No. 7*, Bertel Johnson and Donald S. Praeger, engaged partly on patrol work and partly as tender for the Kvichak and Naknek weirs.

Nushagak Bay.—Launch *No. 3*, Warden Fenno and Wesley Haynes.

Only one violation of the fishery regulations was reported.

The total number of gill-net boats fished in the district in 1931 was 1,059, consisting of 811 operated by the canneries and 248 by independent fishermen—local whites and natives who sold their catches to the canneries. Of the independent boats, 129 were used by white residents and 119 by natives, as compared with 66 by whites and 125 by natives in 1930. The number of commercial stake nets operated increased from 134 in 1930 to 188 in 1931.

RUNS AND ESCAPEMENT OF SALMON

There was a good run of red salmon in Bristol Bay, especially on the east side from Ugashik River to the Kvichak River. The escapement in the Egegik, Naknek, and Kvichak Rivers was far above the average, as was also that at Ugashik, where the weir count showed the largest escapement since the rack was established in 1926. While the run in the Nushagak River was not as heavy as elsewhere in the bay, there was a fairly good escapement. The bulk of the run at Nushagak struck in on July 4 at the beginning of a weekly closed period. Examination of the important spawning areas tributary to Bristol Bay was made by bureau observers at the close of the fishing season.

DESTRUCTION OF PREDATORY FISHES

The work on predatory enemies of salmon was continued to the full extent of available funds, part of which were furnished by the Territory and part by canners of the district, who assessed themselves $8,000, to be handled and disbursed under bureau supervision in the same manner as were the Territorial funds. Not only is this work of recognized benefit to the future of the salmon industry, but it contributes immeasurably to the support and welfare of the local residents. Nearly all of the Bristol Bay population engaged in the predatory activities, so that it was necessary for the bureau to fix a limit for each subdistrict, in accordance with funds available, and when the limit was reached to discontinue the work. The entire quota was 405,000 predatory fish, and of this number 339,748 were reported taken in 1931. The remainder of the quota will be taken during the winter months from the Naknek and Ugashik areas, which were the only sections that had not reached the number allotted them. Representatives of the bureau have supervised the predatory work and the improvement of the salmon spawning grounds in the Bristol Bay region throughout the year, continuing individual activities after the special funds for the payment of local inhabitants were exhausted.

INSPECTION OF SPAWNING AREAS

WOOD RIVER DISTRICT

Observations made by Warden Eric D. Fenno showed that the escapement of salmon to the spawning grounds in the Wood River Lakes district was sufficient to seed these areas in fairly good quantities. There was less than even a fair number of salmon on the beds of the first lake, but on the upper lakes they were fairly plentiful, although somewhat fewer than in a good average year. It was estimated that for the entire watershed the escapement was about 60 per cent of that for an average normal year.

It was believed that the escapement was nearly sufficient for the amount of spawning area, for the water level of the lakes was almost as low as in the summer of 1926. This condition reduces to a great extent the amount of spawning area. However, there was little danger of a loss of spawn, as the fall rains had commenced raising the water level of the lakes.

There was a good escapement of red salmon into Igushik and Snake Rivers.

ILIAMNA AND LAKE CLARK DISTRICT

The following report was made by C. M. Hatton covering his investigation of the Iliamna and Lake Clark spawning areas in August and September:

> Approximately 4,700 salmon were estimated in Tommy Point Creek on August 13, this total including both live and dead fish. Many trout were observed in the stream.
>
> From August 14 to August 16 an examination was made of Iliamna River from Japanese Point near its mouth to about 1 mile above the forks. The counts of salmon made on the above dates totaled 70,600. There were 43 large schools ranging in size from 150 to 3,800 fish. An estimate of 2,500 was made for the number of salmon farther up the river. All tributary creeks and sloughs were filled to capacity and particularly the Chinklegash and Old Williams Creek. Numerous dead salmon were noted on the spawning areas. Only a very few trout were seen.
>
> On August 24 another visit was made to Iliamna River. On this date salmon were seen jumping and finning outside the river mouth, and in the river large schools of bright salmon were observed. Information obtained from white and native residents was to the effect that on August 21 this run of salmon arrived at the mouth of the river. On August 24 the fish had ascended the river only as far as the village. The estimated number of salmon from the mouth of the river to Iliamna village was placed at 25,000. The total estimated escapement for the river was 95,600. The exceptionally low water-level of the river during this period will probably insure better hatching conditions in the spring. It was the current opinion of the residents that the run was the best since the seasons of 1917 and 1919.
>
> On August 25 an examination was made of the two creeks at the head of Pile Bay. These creeks have their sources in small lakes. Ponds are formed by the union of the creeks a short distance from the head of the bay. The creek to the right of the ponds is short, sluggish, and of a swampy nature. The spawning beds are not extensive; in fact, not over a quarter of a mile of the stream bed is available for seeding, and the lake at the head of the creek is inaccessible to salmon. Many trout were noted. There were counted 1,731 salmon spawning in the creek and 150 dead and spent ones. The creek to the left of the ponds is much larger than the other tributary, extending a distance of about 3 miles to the lake at its source, and it affords splendid gravelly areas for seeding purposes. The number of salmon counted in this stream was 14,100, and it was believed that as many more were present that could not be counted. Trout were plentiful.
>
> Pile River also was examined on August 25. Considerable difficulty was encountered in estimating the number of spawning salmon, for the water of this river is of glacial origin and laden with silt. The estimated escapement was 8,500, which is believed to be an average escapement here.

An examination of Pedro Creek and Pedro Bay was made on August 16. Many of the shallow spring ponds of the stream were filled with spawning salmon, as was the case in practically the entire stream. Hundreds of sea gulls were noted eating salmon eggs in the shallow ponds. The escapement to this stream was estimated at 120,000. No trout were noted during the inspection. It is the opinion of the residents at Pedro Bay that this season was on a par with 1918 and 1922 and better than any run since those years.

Knudson Bay Creek was visited on August 26. Approximately 3,100 salmon were in the stream and 16,000 in the bay at the stream mouth. No dead or spent salmon were found in the creek. It is the belief of a local resident that the escapement of salmon to Knudson Bay this season was the best ever experienced.

The examination of Kinney Creek was made on August 28. Along the shore from Kinney's cabin on Knudson Bay to the mouth of the creek there were approximately 12,000 salmon. Just inside the stream mouth was a large school of fish numbering about 9,000 that extended into a slough at the right of the mouth. The stream was examined for an approximate distance of 6 miles. Schools of salmon were not numerous, but the river bottom was amply covered with spawning salmon. The total number of salmon in the stream, including both spawning and spent fish, was estimated at 112,200.

Kokotano and Canyon Creeks were examined, and good escapements were found in both creeks. It is believed that in the area from and including Kinney Creek in Knudson Bay to and including Eagle Bay Creek, there were well over a million spawning salmon. The waters of all creeks and bays were unfit for drinking purposes. Dead salmon lined the shores of lakes and the banks of streams. Sea gulls and ducks were so full of feed that they were scarcely able to fly. It is the general belief among the local inhabitants that the run of fish this season was about on a par with the best years in the past.

The examination of the Lake Clark system was begun on September 3. Several hundred salmon were noted in the upper ponds of Roadhouse Creek. In the Newhalen River a continual school of fish was seen from the landing to Big Lake Clark. The water was very discolored, and it was impossible to estimate the number of salmon; but there appeared to be thousands on their journey to the upper spawning grounds. Natives and white residents of Nondalton stated that this has been the largest salmon escapement in the district to their knowledge, not excepting 1917, 1918, or 1922. All the sloughs and tributary creeks were filled with milling salmon. The portion of the lake that fronts Nondalton was alive with salmon, and it was reported that this condition had existed since late July. All the residents had prepared their supplies of dried fish. The water in the river was unpleasant to the taste, and as fish were continually arriving it would soon be unfit for drinking purposes.

On the morning of September 4 departure was made from Nondalton to Tarnalia Point. Salmon were in evidence the entire distance. A trip was then made over the portage to the falls below Brooks Lake. According to local residents it has been observed that fish school below the falls in considerable numbers during good years, but salmon have never been known to ascend the falls. No salmon were observed below the falls or in the three forks of the river. At the mouth of each branch, and extending for long distances on each side, large schools of salmon were noted. The entire shore line from Nondalton to Little Lake Clark, with but few exceptions, is a vast spawning area.

The inspection was continued to Kijik Lake on the following day, via Kijik Portage. Red salmon were schooled at the mouths of the three creeks at the head of the lake. The estimated escapement to these streams was placed at 18,000. The fish had not acquired the reddish tinge that is associated with spawning activities. Although good numbers of salmon were seen at the entrances of these creeks, only a very few were in evidence in their main courses. Approximately 50 salmon were seen at the mouth of Kijik River. The salmon had not ascended into the river at the time of the inspection. On the same day the small creek located about a mile below Kijik River was examined. Approximately 160 bright salmon, with a few dead ones, were found in the creek.

On the morning of September 6 observations were made at Big River, and as no fish were found there the trip was continued to the stream at the head of Little Lake Clark. Here, as at Big River, salmon had not yet arrived. The immediate mouth of the stream is not very suitable for spawning, but the river proper affords ideal seeding area. It was felt that this inspection was made approximately three weeks too early, for on the morning of September 7 about 50 salmon were seen leaping in the air at the lower end of Little Lake Clark, which appeared as bright and green as the fish when they first arrive in Bristol Bay. The journey was continued to Current Creek, and no salmon were passed en route, with the exception of the few mentioned above. The spawning ponds and sloughs of Current Creek were barren of salmon. A broken shaft on the outboard motor made it necessary to row to Tarnalia Point, where repairs were made. On September 9 the trip was resumed to Pickerel Creek, which is located just above the islands between Nondalton Lake and Lake Clark proper. An immense beaver dam forms an obstruction to the ascending salmon, thus cutting off considerable spawning area. Hundreds of salmon were noted below the dam. The trip of inspection was concluded at Roadhouse Portage, Lake Iliamna.

The water level of Lake Clark and its tributaries was the lowest that has ever been witnessed by the oldest inhabitants at this particular time of the year.

The run of salmon from Kijik to the head of the lake was far behind its usual time, the first salmon appearing at Tarnalia Point on June 13 and at Kijik on July 16.

Natives from Kokhonak reported that the streams in Kokhonak Bay were well populated with salmon, and the lake at the head of Kokhonak Creek was filled to capacity, as were the tributaries thereto. It was also reported that Belinda Creek had a very good escapement of fish.

AERIAL SURVEY

During the 1931 season an aerial survey of the spawning grounds was made for the first time in the Bristol Bay area. While the results accomplished were not wholly satisfactory, due to unfavorable weather conditions, they were sufficient to indicate the possibilities offered by this means of travel if a plane were available to make the trip at appropriate times and if stops could be made when the examiner found it desirable to make additional investigations on foot. The advantages of aircraft for obtaining a complete check on all important salmon spawning areas, as well as a means of control over the patrol of any large district, are obvious.

Mr. Winn's report on the aerial survey is as follows:

On August 19 departure was taken from Cordova to Bristol Bay on the seaplane *Ketchikan* of the Alaska-Washington Airways (Inc.). Routing was made over Jackpot Bay and the northern end of Port Bainbridge, Prince William Sound, to ascertain the relative position and importance of the lakes in these areas in association with future weir installation. Travel was continued to Iliamna and then to the bureau's marine ways at Naknek.

On the following day Warden Fenno accompanied the writer on the aerial inspection trip. The plane circled the Naknek Lake series, passing over Naknek Lake to the Bay of Isles, then into Lake Grosvenor, and up Coville Lake to the stream at its head. This stream was well supplied with fish. Good numbers of salmon were noted in the mouth of the stream that is located about midway on the north shore of Naknek Lake. Fair numbers were observed also along the north shores of Grosvenor and Coville Lakes. The fog ceiling lowered to such a degree during the flight that flying was confined to very low altitudes, thereby making estimates of the escapement impossible except during short intervals when the fog lifted and ascent could be made to a higher level. The course continued down Savonski River into Iliuk Arm, thence to Kittiwake Creek, and into Brooks Lake. There was a heavy escapement into the creek, and a schooling of salmon at the outlet of Brooks Lake indicated that apparently the fish had just passed up from Naknek Lake. Brooks Lake was circled, and only one fairly large school of red salmon was seen along the shore, this being at the head of the lake. An endeavor was made to fly into Becharof Lake, headwaters of Ugashik River, but heavy banks of fog between the mountains forced a retreat to water safety. A landing was made in Kukaklek Lake, one of the Lockanok series. Due to continued interference by fog a return was made to Naknek. The escapement of salmon, while better than fair, was not considered sufficient for maximum seeding, for more salmon could be accommodated on the vacant spawning areas in the Naknek Lake system.

Weather conditions improved and a take-off was made for Snag Point, on Nushagak River, in the early afternoon. It required 45 minutes to cover the distance of approximately 70 miles. The trip was then resumed to the Wood River and Tikchik Lakes. The five Wood River lakes were circled and fair numbers of red salmon were noted spawning at the mouths of various tributaries and along the shores of each lake. An accurate estimate of the number of fish was impossible because of the fog. However, it was observed that the upper lakes contained most of the spawners. Local inhabitants were engaged in the destruction of the predatory enemies of salmon on each lake.

The flight was then continued to the Tikchik Lake series. Fair numbers of salmon were seen along the shores of the first two lakes but none in the upper lakes. There are 5 lakes in the Tikchik chain, 3 large ones and 2 small connecting lakes. Fog interfered with all but the close-up observations; and these were not satisfactory, as flying so low made it difficult at times to see the fish. The spawning possibilities in the upper lakes appeared very limited, as only the heads of these lakes are favorable for seeding areas. It was planned to cross over to the Mulchatna and Upper Nushagak Rivers, but this plan was frustrated by continued fog which hindered observations and made flying hazardous, necessitating a return to Snag Point. Judging from the aerial observations, there appeared to be a fair escapement.

As it was learned that weather conditions such as were encountered usually prevail for about a week or 10 days, and as indications pointed to such a continuation, it was deemed advisable to leave the district without visiting the Igushik and Snake River lakes. Warden Fenno remained in the Nushagak district for fall and winter work.

The survey was continued on August 21, departure being made from Snag Point for the eastern shore of Bristol Bay. In crossing over to Kvichak Bay the plane passed through a dense bank of fog. Lockanok River was reached and followed for about 60 miles in a direct line, the stream being about 100 miles in length as it meanders to the lake at its source. This river is composed of numerous small channels in its upper reaches, covering a vast territory of lowland, which makes it extremely difficult to reach the lake by boat from Bristol Bay. The river separates into two branches near its head, the branches rising from lakes that lie parallel to each other. These lakes are of good proportions, and at the head of each a narrow neck of water circles around the bases of the mountains. Observations farther inland were prevented by the fog. A landing was made in Lake Grant which is the upper one of the two lakes. No fish were seen during the flight, as conditions were unfavorable for proper examination.

The trip was continued to Lake Iliamna. The inspection of Belinda Creek was unsuccessful as it was necessary to fly at such low altitudes. A temporary lift of the fog enabled an examination to be made of a small portion of Kokhonak Creek. A good escapement was noted near and inside the river mouth and for about a mile up the river. An examination of the lake at the head of Kokhonak Creek, the lakes tributary to Kokhonak River, and the upper reaches of Copper River was impossible due to weather conditions. No information was obtained on the lower reaches of Copper River because of poor visibility. The flight was continued to Roadhouse Portage across Iliamna Lake. It had been planned to survey Lake Clark and its tributaries from this point, but as weather conditions were unfavorable it was felt that nothing could be achieved by continuing the aerial observations. Weather reports indicated no signs of improvement, so a return was made to the base at Cordova. The total number of miles covered on the trip was approximately 2,000.

GENERAL SUMMARY

From observations made by bureau employees over the entire district Mr. Winn summarizes the situation as follows:

The escapement into the Naknek Lake series was the most satisfactory for several years. The bureau has maintained a counting weir in the Naknek River since 1929, which shows the improvement in the salmon run as follows: In 1929, the escapement was 561,916; in 1930, 287,208; and in 1931, 1,117,629. Observations by airplane of the spawning grounds indicate that a much greater number can be accommodated for maximum seeding efficiency.

The Ugashik district received one of the heaviest escapements of red salmon in its history. The records of escapement through the counting weir maintained in the Ugashik River since 1926 had shown a discouraging decline up to the current year. The escapement of 1931 was far ahead of that of the corresponding cycle in 1926, which is an encouraging indication for the future. The weir counts for six consecutive years are as follows: In 1926, 786,775; in 1927, 443,283; in 1928, 202,966; in 1929, 147,513; in 1930, 168,988; and in 1931, 1,379,623.

The movement of fish in the Iliamna-Lake Clark district resembled that of 1926, when the major portion of the escapement passed into streams along the north shore of Iliamna Lake and into Newhalen River en route to Lake Clark and its tributaries. Observations of prior years always showed that spawning was late in Big and Little Lakes Clark.

The bureau representative at Becharof, after a preliminary examination, reported the best escapement in Becharof Lake that has occurred during the past three years. The stream guard at Egegik reported a steady escapement during the season in fair proportion to the commercial catch. A very heavy escapement was noted about the middle of the commercial season when the writer made a personal examination of the river as far as the lake.

The escapement along the west shore was excellent in proportion to the extent of the run. At Nushagak the escapement was better than in fair average years, while the Igushik and Snake River Lakes received the best run that has occurred for the past 11 years. The increase in escapement into these lakes each year is one of the most gratifying conditions noted in the bureau's work in Bristol Bay.

Considering the escapement for the district as a whole, a heavy increase is shown over the corresponding cycles. It is felt that the predatory work that has been carried on by the bureau in cooperation with the Territory and the Bristol Bay canners has been an important factor in this increase. The movements of fish in localities along the east shore correspond with the 1926 cycle, but the extent of escapement this year was far greater than that of 1926, with the single exception of Egegik, which harbored an excess of spawners in that year. The escapement at Egegik in 1931, although less than in 1926, was considered adequate for efficient seeding.

KUSKOKWIM RIVER

From the early part of June to the end of August the Kuskokwim River area was patrolled by Stream Guard Charles McGonagall with a chartered launch.

A limited amount of fishing for export was carried on in June and July off the mouth of the river, one company putting up a quantity of mild-cured king salmon, and two outfits preparing pickled kings and reds. The sides and backs of the salmon used for pickling were used by the natives camped near the salteries.

Taking the season as a whole, the runs of reds, chums, and cohos were the lightest that the Kuskokwim River has had for years. The king run was fairly good, but little effort was made by the natives to catch kings, as they prefer the smaller fish for dog feed.

Three hundred and eighteen natives fished in the river for local requirements, using 638 gill nets of 9,570 fathoms, 38 wheels, and a number of small boats. The products consisted of 253 tons of dried chums.

YUKON RIVER

Since 1925 commercial fishing in the Yukon area for export from Alaska has been prohibited, the only operations being carried on for local requirements and to supply the market for dried salmon throughout the interior of Alaska. The demand for dried salmon, however, has lessened greatly in recent years, since the dog teams have been replaced by aircraft in the mail service. Therefore the regulations issued in December, 1931, to be effective in the following year, have been modified to permit limited commercial fishing off the mouth of the Yukon.

Inspector C. F. Townsend and one stream guard were again on duty at the fishing grounds throughout the season, patrolling the district on the *Coot*. Departure was made on May 21 from Nenana for the mouth of the river. Spring was late, and snowstorms and blizzards were encountered all the way to Holy Cross. In the lower river region there was no rain through June, July, and part of August, an unusual condition for that part of the country, and nearly all of the dog feed was sun-cured without any smoke. Above Anvik to the headwaters of the Yukon and Tanana, however, it rained almost continuously during the summer and both rivers were at flood stage most of the time the salmon run was on.

The first king salmon were caught at the mouth of the river on May 31. The big run started on June 10 and continued through July 15. In the last few years the catch of kings has been made chiefly in the south mouth of the river, but this season the main run came through Kwiguk Slough. The run of chums started June 15 and continued in very large numbers to July 25. Many beluga whales and hair seals were observed in the river during this time. A second run of chum salmon occurred from August 10 to the end of the month. There was virtually no September run in any part of the river.

Products of the Yukon and Tanana fisheries were as follows: 233 cases of kings canned; 12,940 pounds of kings and 4,510 pounds of chums pickled; 576 pounds of beleke from kings; 700 pounds of kippered kings; and 367 tons of dried chums. Apparatus consisted of 221 wheels, 151 gill nets of 1,022 fathoms, 1 power dory, 4 gill-net boats, and miscellaneous small boats. There were 12 whites and 300 natives engaged in the fishery.

WEIRS FOR COUNTING SALMON ESCAPEMENT

The counting of salmon that ascend particular streams to spawn has long been recognized as an invaluable aid in the study of the life history of these fish, as well as providing a means of regulating the commercial catch to insure an adequate escapement of brood fish to the spawning grounds. Weirs for this purpose were operated in 27 of the more important salmon streams of Alaska in 1931, an increase of one over the number operated in the previous year. Of these, 9 were in southeastern, 15 in central, and 3 in western Alaska.

The weir work was extended to the Prince William Sound district for the first time in 1931, two new racks being installed in tributaries of Eshamy and Olsen Bays. A new weir also was established in Nutkwa Creek to take the place of that operated in 1930 in Keete Creek near by. The Kvichak weir in the Bristol Bay region, which was included among those maintained in 1930, was not operated in 1931, although considerable work was done in assembling materials at a new site in preparation for a weir count in the following season.

Reports of operations of the various weirs and of the counts of salmon in 1931 are as follows:

ANAN CREEK

The weir at Anan Creek was installed approximately a quarter of a mile upstream from the old weir site, at a point about 200 yards above the second or main falls. This change in location necessitated considerable additional work in assembling and transporting supplies and materials, clearing a trail and building a board walk from the salt-water landing to the new weir site, and establishing a camp for weir men. The weir was completed on June 5; and the first count was made on June 7, when 23 steelheads were tallied.

Pink salmon began to pass upstream on June 17. The main run occurred in the period from July 6 to July 18, reaching its peak on July 15, when 31,906 pinks passed through the weir. A second good showing appeared from July 26 to August 1, after which the run declined gradually until September 1, when counting operations were discontinued because high water made it necessary to keep the gates open to prevent damage to the weir structure. During the season there were counted 613,598 pink salmon, or nearly 50,000 more than the escapement in 1930, the previous record year since the weir was first operated in 1925. In addition to the pink salmon, 1,206 cohos, 42 kings, 31 reds, 27 chums, and 172 steelheads were counted. Several thousand salmon, chiefly pinks, passed upstream after counting ceased. Walter J. Larson was in charge of operations at this weir, under the supervision of Assistant Agent S. A. Baker.

CALDER CREEK

Construction of the weir at Calder Creek was completed on July 5 at a point 150 feet downstream from the former location. Salmon ascended the stream very late; and it was August 10 before the first count was made, although large schools had been in the shoal water of the bay for two weeks. Heavy rains occured on August 22, and the bulk of the run passed upstream during the following week. Counting was continued through September 23, when the total escapement numbered 31,959 pinks, 17,125 chums, and 193 cohos. Approximately 12,000 salmon were in the creek below the weir at the time the structure was removed. Operation of the weir was in charge of Richard Emery and supervised by Warden C. L. Olson.

EAGLE CREEK

Work of installing the weir at Eagle Creek was begun on July 1 and completed on July 4. A few red salmon were observed at the mouth of the creek on June 29, but they did not begin to pass upstream until July 5. The first pink salmon were observed off the mouth of the creek on August 1 and began to pass through the weir on August 7, although very few in number until August 19. The heaviest run took place between August 23 and September 11, reaching its peak on August 28, on which date there was an escapement of 61,110 pinks. The total count for the season numbered 532,678 pinks, 49,802 chums, 17,414 reds, and 3,313 cohos. In addition, it was estimated that 50,000 salmon (45,000 pinks, 4,500 chums, and 500 cohos) passed upstream during the period of high water on September 5 and 6, when no count was possible. Also, at the time of the removal of the weir on September 29 there were approximately 22,000 pinks and 25,000 chums that had not ascended to the spawning grounds. As in previous years, the count was made by J. A. Kelly under the direction of Assistant Agent S. A. Baker.

KLAWAK CREEK

A weir for counting the escapement of spawning salmon in Klawak Creek was established at the same location as in the preceding year, construction being started May 31 and completed June 4. Red salmon began to pass through the counting gates on June 5. While the run of this species was never heavy, it was fairly steady throughout July and August, and the total escapement was considerably larger than for the past several years. The first pink salmon appeared at the weir on July 26, but no appreciable numbers were tallied until August 11. A count of 96,060 pinks on August 28 marked the peak of the run. Counting was continued through October 10, when the total escapement numbered 535,748 pinks, 151,543 chums, 34,184 reds, and 6,322 cohos. Ernest Petry had charge of counting operations, under the direction of Warden C. L. Olson.

NUTKWA CREEK

A weir was put into operation this year for the first time in the stream at the head of Nutkwa Inlet, at a point about three-fourths of a mile above the lagoon, where the stream is 130 feet wide and from 1 to 4 feet deep. Considerable difficulty attended the transportation of material to the weir site, as the lumber and other material had to be made up into small rafts and lined through Nutkwa Rapids, then towed 5 miles to the head of Nutkwa Lagoon, thereafter carried around log-jams, and again made into rafts for towing upstream. The weir structure and camp for the watchmen were completed before any salmon appeared in the stream.

The first salmon passed through the gates on July 27 but they were very few in number until August 16, and throughout the season the count was light. Exceptionally high and swift water, with consequent washing of the sandy stream bed, caused the weir to settle and break on September 5. The water level remained high for a week, and it was September 15 before the rack could be replaced. During this period the salmon run was at its best, and it was estimated that approximately 40,000 pinks, 1,000 cohos, and 9,000 chums ascended while the weir was out. Counting was continued through September 27, when the total count numbered 35,565 pinks, 9,763 chums, 2,653 cohos, and 83 reds. Anton Rex had charge of the weir construction and of counting operations, under the supervision of Warden C. L. Olson.

OLIVE COVE

The work of erecting the Olive Cove weir, including the clearing of the trail, the transportation of lumber and materials, and the building of a ⅜-mile board walk from the salt water landing to the weir site, was carried on from June 6 to June 30. In this period, also, a special inclosure, 15 by 32 feet, was built, as in the preceding year, to hold approximately 800 salmon for scientific study during the season.

A few salmon were observed in the bay on June 30, and some were in the stream below the falls on July 2, but the first to be counted through the weir were 350 pinks on July 9. The bulk of the run passed upstream in July, the highest tally for any one day being 10,108 pink salmon on July 24. Counting was continued through September 5, when the total escapement for the season consisted of 113,689 pinks, 406 cohos, 389 chums, and 2 reds. Walter Campen was in charge of operations at this weir under the direction of Assistant Agent S. A. Baker.

STANEY CREEK

Construction of the Staney Creek weir was begun on July 1 and completed on July 8. The location of the structure was moved from the former site to a point upstream where the wider stream bed and deeper water would lessen the pressure of the current during rainy periods. Here the stream is 210 feet wide and has an average depth of 3 feet. Several times during the season heavy rains raised the water to a depth of 9 feet. Unlike the condition in the majority of streams in southeastern Alaska, the escapement into Staney Creek showed a heavy decline from that of the previous year and was insufficient for seeding the spawning beds. Counting of salmon was begun on July 10 and continued through September 17, when the total escapement numbered 17,667 pinks, 8,328 chums, and 2,188 cohos. Counting operations were in charge of Ed Nordlund, under supervision of Warden C. L. Olson.

WHALE PASSAGE

Construction of the Whale Passage weir was begun on July 2 and completed on July 9. The first count was made on July 10, when 54 cohos passed through the rack. Pink salmon began to ascend on July 30, but no appreciable numbers appeared until August 11. The main run of pink salmon was from August 22 to September 1, the peak being reached on August 27, with a count of 51,827 for that day. A second good showing occurred between September 9 and 14, after which there was a gradual decline until counting was discontinued on September 28. The total escapement consisted of 508,818 pink salmon, 19,516 cohos, and 68,617 chums. It was estimated that 35,000 pinks, 1,000 cohos, and 500 chums were in the stream below the weir at the time the structure was removed. The work at this place was under the supervision of Assistant Agent S. A. Baker, with Charles Nelson in charge of counting operations until August 22 and Frank Reed thereafter until the end of the season.

SITUK RIVER

Installation of the weir at Situk River was completed on June 10. Counting began on June 14 and was continued through August 15, when the weir was put out of commission by high water. Several times during the season it was necessary to extend the weekly closed period for 18 or 24 hours in order to permit an escapement of at least 50 per cent of the run to the spawning grounds. The total number of salmon tallied during the season numbered 270,850 reds, 64,253 pinks, 2,967 kings, and 42 cohos. In addition, it was estimated that there was an escapement of approximately 30,000 red salmon following the suspension of weir operations. Warden Harry A. Pryde supervised the work at this place.

ESHAMY RIVER

The counting of salmon at Eshamy River was begun in 1931 by the establishment of a weir about 800 feet from the mouth of the river. The structure was of the usual tripod type, with two counting gates. Counting began on July 7 and continued through September 30, when the total escapement numbered 78,980 reds, 4,741 cohos, 6,157 pinks, and 16 kings. The work at this place was in charge of Jack Harris, under the direction of Warden N. O. Hardy.

OLSEN BAY

A new 120-foot weir of the tripod type was put into operation for the first time this year in the stream at the head of Olsen Bay. The rack was completed on June 7, but it was not until June 28 that the salmon began to pass upstream. On that date eight chums were counted, the run continuing in small numbers thereafter until the early part of September. Although 4 pink salmon passed through the gates on July 6, it was not until 20 days later that the next count was made, and no appreciable numbers appeared until August 13. As a large school of pink salmon was noted inside the stream markers on July 25, it is evident that the fish spend considerable time in brackish water at the mouths of streams before they begin to ascend. The weir was maintained through September 15, when the total escapement numbered 27,506 pink salmon, 3,821 chums, and 11 cohos. Robert Rogers acted as operator of the weir and stream guard of the Olsen Bay area, under the supervision of Warden N. O. Hardy.

KARLUK RIVER

The erection of the Karluk weir was begun on May 6; and although attended with some difficulty because of high water, it was completed on May 14. The first red salmon were observed below the weir on May 19, but they did not begin to pass through the counting gates until May 24. Counting was continued through October 8, when the total escapement was 873,428 red salmon, 3,303 kings, 9,050 cohos, and 43,496 pinks. A few reds, cohos, and steelheads were still in the lagoon at the time the weir operations were suspended and the structure was removed.

Commercial fishing for salmon in Karluk waters began on June 6 and closed on September 28. The reported commercial catch of red salmon from the Karluk run was 692,786, or approximately 44 per cent of the total.

The first red-salmon fingerlings migrating downstream were noted on May 21, the migration continuing through June. Fifty thousand of these fingerlings were marked for scientific study. Efforts to exterminate predatory fishes were curtailed by high water and by the presence of large numbers of red-salmon migrants, but some 3,000 Dolly Varden trout were caught with a seine during the season.

Counting operations at the weir were in charge of Ray S. Wood, under the direction of Warden H. H. Hungerford.

ALITAK BAY

Weirs for counting the escapement of spawning salmon in the Alitak Bay region were again operated in four streams tributary to Olga Bay. The weir at the cannery station was completed on May 7, that at the upper station on May 11, the Horse Marine Lagoon weir on May 21, and the Silver Salmon Creek weir on June 30. Traps for the capture of Dolly Varden trout were installed at all weirs, and small seines and hand lines also were used from time to time in this work, resulting in the take of 67,304 of these predatory fishes during the season.

Red salmon began to appear at the cannery station weir on May 23, and at the upper station on the following day, while at the other weirs no salmon were tallied until nearly the middle of July. The run at Silver Salmon Creek was very light and of short duration. As heretofore, the bulk of the red-salmon escapement passed through the upper station weir, where the run reached its peak on August 30, with a tally of 55,021 reds on that day. Of a total of 340,236 red salmon counted, 297,618 were tallied at the upper station, 29,100 at the cannery station, 1,351 at Silver Salmon Creek, and 12,167 at Horse Marine Lagoon. In addition, 17,013 pinks, 7,129 cohos, and 31 chums were counted through the racks. All weirs were removed on September 25, when there were showing very few salmon other than cohos, which were reported quite abundant in Olga Bay. The total reported catch of red salmon in commercial fishing was 226,326.

The bureau's work at Alitak was in charge of Henry B. Looff, under the supervision of Warden H. H. Hungerford.

CHIGNIK RIVER

The site of the Chignik weir was 6 feet below its location the previous season, the river at this point being about 445 feet wide and from 2 to 6 feet deep. Construction was started on April 29; and by May 4 all tripods had been set and the stringers put on, ready for fencing with pickets. At that time, however, ice began coming down the river and continued for two weeks in such quantities that every effort was required to prevent damage to the unfinished weir structure. Work on the weir was resumed on May 19, but on the 22d it was interrupted by a freshet which washed out five tripods and broke some of the stringers. It was not until July 1 that the water had receded sufficiently to permit further work on the weir. On July 10 the river was closed so that no fish could pass, and counting at one of the gates was begun on the following day. When completed, the weir had six 22-inch counting gates and one 76-inch gate to permit the passage of small boats up and down the river.

Prior to June 15 the salmon run at Chignik was light, and from June 16 to July 18 it was fair. The best run of the season occurred from July 19 to August 3, reaching its peak on July 22, when 68,906 red salmon were counted through the weir and 1,342 were caught commercially. The run continued fair throughout August, after which there was a gradual decline to the end of the run on October 7. The total count of red salmon was 605,352. In addition, it was estimated that 107,600 reds passed upstream before the rack was installed, making a total escapement of 712,952 reds. There were also tallied at the weir 27,630 cohos, and 1,343 kings.

The red salmon of the Chignik run were large in size this season, and fewer grilse were observed than in the preceding year. An exceptionally good migration of salmon fingerlings was noted; the first were seen going downstream on May 14, and the migration continued in good numbers to August 15.

Five traps for the capture of salmon were operated in Chignik Bay and Lagoon by the three canneries that have engaged in the industry in this district during previous seasons. The first trap to be operated was brailed on June 8 and the last on September 16. The total catch of red salmon was 637,974. Operations at the Chignik weir were in charge of Warden Charles Petry.

AYAKULIK OR RED RIVER

The Red River weir was completed on May 24, and on the following day 356 red salmon and 18 kings were tallied. Very few of the latter species were in the river at that time, as most of the run had passed upstream before the weir was installed. The capture of predacious fishes by seines was undertaken as soon as the weir was completed, and later by a trap installed above the weir, a total of 50,320 Dolly Varden trout being caught during the season. Migrating red salmon were abundant from June 3 to June 18, and a few were observed in the early part of July. The operation of the weir was continued through September 14, when high water made its removal necessary. The total count for the season numbered 618,315 red salmon, 15,510 cohos, 14,166 pinks, and 447 kings.

Operations at Red River were in charge of Henry B. Looff, under the direction of Warden H. H. Hungerford.

UGANIK RIVER

The work of installing the weir at Uganik River was started on May 31, but was interrupted on June 5 by high water, which did not subside until June 28. When construction work was resumed it was necessary to move the weir 110 feet downstream from the former location, because the freshet had washed out the banks and had left holes in the river bed. The rack was completed on July 3 and was in operation from July 4 through September 4, during which time 6,791 reds, 71,281 pinks, 1,986 cohos, and 2,968 chums were counted. It was estimated that approximately 10,000 red salmon had passed upstream before the weir was installed. H. Olafson was in charge of operations at this weir, under the supervision of Warden H. H. Hungerford.

KAFLIA BAY

Installation of the weir in the salmon stream tributary to Kaflia Bay was completed on June 11, the work having been hampered considerably because of high water. No salmon were observed in the bay until June 10. Only a few migrating red-salmon fingerlings were noted, as most of them went downstream when the water was high and discolored, making observation difficult. The weir was maintained through August 25, when a total of 11,945 red salmon had been counted. John Gilbert was in charge of the weir under the supervision of Warden H. H. Hungerford.

ENGLISH BAY

The weir was placed in the stream at the head of English Bay on May 25 and 26, and the first red salmon passed through on June 1. The escapement was exceptionally light up to June 30. From that date to July 22, there was a decided improvement, which brought the total count to 18,878 at the end of the run on July 30, when the weir was removed. Capt. R. L. Cole supervised the work, Jack Tansy carrying on counting operations until the latter part of June and Ralph Sparks thereafter until the end of the season.

CHINIK CREEK

The Chinik Creek weir was partly installed on June 1 and completed on June 12. Red salmon began to show in the inlet on June 15, and a few were seen near the falls at the mouth of the stream on the following day, but none passed through the weir until July 1. As the commercial catch to that date was approximately 25,000, it was recommended that additional waters in the vicinity be closed to commercial fishing, and an order was accordingly issued, effective July 6. The last of the run was counted on July 22, when the total escapement for the season numbered 33,514 red salmon. Operations at the weir were carried on by James Hart and supervised by Capt. R. L. Cole.

KALGIN ISLAND STREAM

Although no weir structure was placed in the stream on Kalgin Island, a count of salmon that ascended on daylight tides was made as in previous years by a watchman stationed near the mouth of the stream. From June 11 to August 10, inclusive, there were counted 9,335 red salmon and 1,470 cohos, and it was estimated that approximately 3,000 reds which could not be tallied escaped during the night tides. Attention was given to keeping the stream mouth free from shifting sands and to exterminating predatory trout, of which 6,596 were captured during the season. The work at this place was performed by Lee Waddell under the direction of Capt. R. L. Cole.

ORZENOI RIVER

The Orzenoi weir was ready for operation on June 14. Although salmon were showing in the bay as early as June 3, none ascended the stream until June 24, when 17 chums passed through the weir. The first red salmon were counted the following day, and pinks began to ascend on July 19. During the early part of the season a considerable number of predatory trout were removed from the stream. The counting weir was maintained through August 11, when the total escapement of salmon numbered 5,756 reds, 14,470 pinks, 2,092 chums, and 558 cohos. Roy A. Buck carried on the work at this weir, under the supervision of Capt. J. J. O'Donnell.

MORZHOVOI BAY

The Morzhovoi weir, on the salmon stream emptying into Middle Lagoon was installed the last week of June, and a watchman was placed there on July 1. Salmon began to ascend on July 2, and the run continued through September 7, reaching its peak on August 29, when an escapement of 4,712 was recorded. The total count during the season was 28,590 red salmon. The work at this weir was performed by Harry Hegman, under the direction of Capt. J. J. O'Donnell.

BEAR RIVER

Following an unsuccessful attempt to install the Bear River weir at the former site, the material was moved downstream about 75 yards, where the river is wider and shallower and the current is less swift. Here the rack was erected without difficulty and was ready for operation on June 24, on which date 14 red salmon were counted. The main run passed upstream between July 11 and July 24, after which the daily escapement was much smaller, although fairly steady, until counting was discontinued at the close of August 21. The total number counted during the season consisted of 210,208 red salmon, 3,145 chums, 112 kings, and 84 pinks. It was estimated that about 15,000 salmon were still in the river below the weir when the structure was removed on August 22. C. R. Sullivan carried on counting operations at this weir under the direction of Capt. J. J. O'Donnell.

NAKNEK RIVER

Construction of the 1,200-foot weir in Naknek River was begun on June 1, and on June 17 the river was closed so that no fish could pass. The first salmon were counted on June 23, and a fair escapement occurred during the next few days. The main run started on July 2 and continued heavy through July 18, the record count for any one day being 188,715 on July 6. Counting was continued through August 9, when a total of 1,117,629 red salmon had ascended the river. This is nearly double the number counted in 1929, when this weir was first put in operation, and almost four times as many as were counted in 1930. In addition to the red salmon, 896 kings, 49 pinks, 44 cohos, and 77 chums were tallied at the weir this season. The work was in charge of Adrian Youngsman, under the supervision of Agent Dennis Winn.

UGASHIK RIVER

Work of installing the Ugashik weir was started on June 18 and finished on June 24. Counting began on June 29, when four red salmon passed upstream, but it was not until July 8 that the fish appeared in any appreciable numbers. During the next three weeks a very heavy run occurred, reaching its peak on July 20, when 167,275 red salmon were tallied. After July 26 there was a rapid decline in the run until August 10, when the work of dismantling the weir was begun. The total count for the season consisted of 1,379,623 red salmon, 12 kings, 7 pinks, 8 cohos, and 145 chums. This escapement was by far the largest that has been recorded since the Ugashik weir was first put in operation in 1926. Henry McFadden, under the supervision of Agent Dennis Winn, was in charge of operations at this weir.

SALMON LIFE-HISTORY STUDIES

The study of the life histories of the Alaska salmon was continued during the year. Dr. Willis H. Rich, of Stanford University, has acted in an advisory capacity in planning this work and has taken an active part in certain of the investigations. In Bristol Bay, Thomas Schulte, under the direction of Doctor Rich, collected data bearing on the runs of adult salmon and on the history of the young salmon in the Wood River system.

The study of the red-salmon runs in the Karluk River was continued by Doctor Rich, assisted by Joseph T. Barnaby. In connection with this study 50,000 young salmon were marked during the course of their seaward migration. The commercial catch was carefully sampled and several hundred adults marked in previous years were recovered. The purpose of these marking experiments is to determine the number of seaward migrants each year as a basis for a more accurate prophecy of later runs. Doctor Rich initiated studies of the life histories and ecology of the red salmon of Afognak Lake and Lake McDonald.

At Chignik a detailed study of the age groups found in the red-salmon runs was again carried on under the direction of Harlan B. Holmes. The study of the young salmon in Chignik lakes and during their seaward migration was also continued. Seton H. Thompson was engaged in a study of the red-salmon runs of the Copper River and made collections of scales and data from the commercial catch and from salmon taken in some of the more important tributaries.

Dr. Frederick A. Davidson continued an important series of investigations dealing particularly with the application of the parent stream theory to pink salmon. During the spring of 1931 he successfully marked a large series of the young pink salmon at Olive Cove, southeastern Alaska, on their seaward migration.

A more detailed account of these investigations will be found in a separate document.[2]

OBSERVATIONS ON THE ESCAPEMENT OF SALMON

Careful observations of the extent of the salmon runs during the season and examination of the spawning grounds at the close of fishing operations were made by bureau employees in 1931, as heretofore, with a view to securing the required escapement of not less than 50 per cent of the runs. These surveys are the means of determining what modifications in the regulations are necessary to build up the runs in certain localities and to maintain the salmon resources at a high level of productivity. Reports indicate that although a number of salmon streams had an insufficient escapement in 1931, the spawning areas in general were adequately seeded.

Southeastern Alaska.—Contrasting strongly with conditions in the previous year, the pink salmon run in the southern district was normal, both as to time of arrival and volume of run. While the fish were not as numerous as in 1930, the size was nearly twice as great and the quality vastly superior. Excellent runs occurred in all portions of the district with the exception of Portland Canal and the Cape Fox shore, where for a long time the odd-year run has been comparatively light. Even in these sections, however, the streams were better seeded than in other similar years. There was a marked increase of red salmon, and chums were much more abundant than last year. The coho run alone decreased sharply. Until late in the season the flow of water in most of the streams was low, but there was little or no loss of fish from this cause, as the rains came in time to save them. An exceedingly heavy run of chums and pinks reached the east shore of Prince of Wales Island toward the close of the fishing season, all streams in this area being seeded to capacity. Karta River had one of the largest runs of chums on record, and reds were also more numerous in this stream than in recent years.

The escapement of pink salmon into the streams along the west shore of Prince of Wales Island was unevenly distributed. Good escapements of pinks and chums were recorded in Calder Bay and El Capitan Passage, but in Tuxecan Passage and Staney Creek the runs of all species were disappointing. The red salmon run at Deweyville, which had been good for the past four years, was a failure in 1931, although the stream contained fair numbers of pinks, chums, and cohos. From Klawak Inlet southward to Cape Chacon pink salmon were much more abundant than in the region from Klawak to Point Baker. Red salmon were more plentiful in Hunter Bay and Klakas and Hetta Inlets than in any other recent year. The run of pink salmon throughout Sumner Strait, Ernest Sound, Bradfield Canal, and Wrangell Narrows showed a marked increase over 1930, and the escapement into the streams was more uniformly distributed than in that year, when some streams were heavily seeded, while others had inadequate escapements.

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[2] Progress in Biological Inquiries, 1931. Report of Commissioner of Fisheries for the fiscal year 1932.

In the Icy Strait and western districts the run was equal to that of 1930, good escapements being recorded for all streams, while in the eastern district salmon were more abundant than in any previous year for which records are available. Conditions in the Yakutat district compared favorably with those of the previous year, with good escapements of reds and cohos.

Prince William Sound and Copper River region.—The runs of all species of salmon in the Prince William Sound area were distinctly smaller than in 1930, and examinations of the principal spawning grounds indicated that fish were not present in sufficient numbers for adequate seeding, except in a few instances. The escapement of red salmon in Resurrection Bay was considerably better than for the past several years and late cohos were fairly abundant in certain streams, but conditions in general were disappointing. In the Copper River district the escapement of reds was satisfactory, nearly all tributary streams examined showing ample numbers of fish for proper seeding. The run and escapement of king salmon were fair. In the latter part of the season a heavy run of cohos appeared, most of which escaped to spawn, as only one cannery was operated during the fall season.

Cook Inlet.—As in the preceding year, the salmon run in this region was irregular, with escapement into the spawning streams decidedly below normal. The red-salmon run, except at Kamishak Bay, was extremely light at first but improved somewhat as the season progressed. A good escapement of this species occurred at Chinik Creek, seeding the spawning grounds adequately, while in English Bay and the Kalgin Island stream the fish were fairly abundant. Virtually all of the streams tributary to Kasilof River and Tustumena Lake were poorly stocked. From Point Gore to and including Kachemak Bay pink salmon were almost as numerous as in 1930, but the run and escapement of this species north of Anchor Point were negligible. Coho salmon, while quite evenly distributed throughout the district, were not as abundant as in 1930, but investigations on the Kasilof and Kenai Rivers and their tributaries indicated fair numbers of this species on the spawning grounds of these important streams, where kings also were found to be more numerous than in the previous year.

Kodiak-Afognak district.—The escapement of red salmon was much greater than in either of the two preceding years, most of the streams on both Kodiak and Afognak Islands being well seeded. Good runs of pinks were noted in all sections, covering the spawning beds to capacity. Cohos were fairly abundant, and satisfactory escapements were reported for most of the streams examined. There was a decided shortage of chums, the escapement being estimated at less than one-third of that of 1930. A most encouraging feature of the 1931 season was the excellent showing of reds in the Bushkin and Eagle Rivers, which for the past decade have had negligible escapements of this species.

Alaska Peninsula.—Along the north shore of the peninsula good runs of red salmon entered Bear River, Port Moller, Herendeen Bay, and Nelson Lagoon. Izembeck Bay had a good escapement of reds and chums, and in streams along the north side of Unimak Island there were fair runs of these species. Mainland streams from False Pass to Morgan Point had a good escapement of chums but only a small escapement of pinks. From Morgan Point to Arch Point the chum-salmon streams had only light runs, while King Cove and Belkofsky had fair numbers of pinks. A good showing of reds was noted at Long John Lagoon and of chums at Pavlof Bay. Good runs of chums and fair runs of pinks entered the streams from Cape Tolstoi to Kupreanof Point, except at Balboa Bay, where the escapement was very poor, apparently due to volcanic eruptions in that region. Acheredin Bay had a large escapement, but in general the spawning beds of the Shumagin Islands were poorly seeded. A fair escapement of red salmon at Wosnesenski Island was reported, and Sanak Island had good runs of reds and fair numbers of chums and pinks. For the Alaska Peninsula area in general there was a good escapement of reds and chums and a light escapement of pinks and cohos.

Bristol Bay.—The escapement of red salmon in the Bristol Bay area as a whole was the most satisfactory in several years. The east side of the bay, especially, had large numbers of fish which were well distributed over the spawning area. The escapement at Nushagak was much better than had been anticipated, although it was estimated as but about 60 per cent of that required for efficient seeding. All other areas of the district were adequately seeded. Reports covering examination of the spawning areas by Agent Dennis Winn and others will be found elsewhere in this publication.

HATCHERIES

EXTENT OF OPERATIONS

The propagation of salmon in Alaska was carried on at two Government hatcheries (at Afognak and McDonald Lake) and at one privately owned hatchery—that of the Northwestern Fisheries Co. at Hugh Smith Lake.

Operations of Federal and private hatcheries in Alaska in 1931

Location of hatchery	Red or sockeye salmon		
	Eggs taken in 1930	Salmon liberated in 1930–31	Eggs taken in 1931
Afognak	[1] 6,347,270	5,553,080	[2] 23,054,720
McDonald Lake	27,469,000	22,480,000	[3] 25,000,000
Hugh Smith Lake (Quadra)	21,190,000	20,266,000	20,280,000
Total	55,006,270	48,299,080	68,334,720

[1] Figures corrected from those given in 1930 report.

[2] Also 32,826 steelhead trout eggs and 2,731,424 Dolly Varden trout eggs were collected, the latter for shipment to the States.

[3] Also 353,000 pink-salmon eggs were collected. Shipped 3,144,960 eyed red-salmon eggs to Seattle in October for the Oregon Fish Commission.

AFOGNAK

The Federal salmon hatchery at Afognak produced and liberated in Litnik Lake and smaller lakes near by 5,553,080 No. 1 red-salmon fingerlings from the 6,347,270 eggs of that species collected in the summer of 1930. The net loss on the take, therefore, was approximately 13 per cent. Of the 13,671,670 pink-salmon eggs collected in August and September, 1930, 10,155,776 were shipped in the eyed stage to the Department of Fisheries and Game of the State of Washington; from the remainder there were produced 1,145,334 No. 1 fingerlings, which were released in Litnik River in April and June, 1931.

In May there were taken near the outlet of Lake Litnik 32,826 steelhead trout eggs, which were planted in Eagle Creek in June.

The collection of red-salmon eggs began on July 29 and ended on October 3, 1931, with a total take of 23,054,720. From October 18 to November 7, inclusive, 2,731,424 Dolly Varden trout eggs were collected for shipment to the States.

M'DONALD LAKE

Of the 27,469,000 red-salmon eggs collected at the Federal salmon hatchery on McDonald Lake in 1930, 3,055,000 in the eyed stage were shipped to Seattle in the fall for distribution in the States of Washington and Oregon. From the remaining eggs there were produced and liberated in Lake McDonald 22,480,000 No. 2 fingerlings, making a net loss on the take of about 7 per cent.

There were also planted in Lake McDonald advanced fry consisting of 85,000 chum-salmon fry, hatched from the 100,000 eggs of that species collected in the preceding year, and 261,000 pink-salmon fry, the brood of the eggs remaining at the hatchery from the take of 7,055,000 after 6,107,000 in the eyed stage had been shipped to Seattle in the fall of 1930.

On March 3, 1931, a shipment of 128,000 eastern brook trout eggs was received at the hatchery for incubation. The resulting fry numbered 116,000, but there was a considerable loss while they were being reared. In September and October 77,050 No. 3 fingerlings were planted in various lakes in the vicinity of Juneau, Ketchikan, Wrangell, Petersburg, and Red Bluff.

In 1931, 25,000,000 red-salmon eggs were collected at this station from August 29 to September 17, and 353,000 pink-salmon eggs from August 29 to September 5. A shipment of 3,144,960 eyed red-salmon eggs was forwarded to Seattle in October for delivery to the Oregon Fish Commission.

HUGH SMITH LAKE (QUADRA)

The Northwestern Fisheries Co. liberated 20,266,000 red-salmon fry from its hatchery near Boca de Quadra in 1931, hatched from 21,190,000 eggs taken in 1930, a loss of 4 per cent. In 1931 the take of eggs began on August 6 and was continued until September 7, during which time 20,280,000 red-salmon eggs were collected.

HATCHERY REBATES

The owners of private salmon hatcheries in Alaska who are also packers of canned salmon receive a rebate on license fees and taxes of every nature on their catch and pack of salmon at the rate of 40 cents per 1,000 king or red salmon fry liberated by them in Alaskan waters. In the fiscal year ended June 30, 1931, only one such private salmon hatchery was operated—that of the Northwestern Fisheries Co. at Hugh Smith Lake—and the rebate due on the 20,266,000 red-salmon fry liberated there during the year amounted to $8,106.

GENERAL STATISTICS OF THE FISHERIES

The total number of persons engaged in the fisheries of Alaska in 1931 was 22,577, or 4,991 less than in 1930. Fishery products were valued at $33,594,752—a decrease of $4,084,297, or about 11 per cent, from the preceding year. Of the total amount, 90.6 per cent represented the value of salmon products; 4 per cent, halibut; 3.6 per cent, herring; and 1.8 per cent, the value of all other fishery products.

Summary of persons engaged and products of the Alaska fisheries in 1931

Items	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Number	Value	Number	Value	Number	Value	Number	Value
PERSONS ENGAGED								
Whites	4, 857		3, 488		4, 015		12, 360	
Natives	2, 828		940		1, 070		4, 838	
Chinese	156		209		305		670	
Japanese	361		345		291		997	
Filipinos	1, 133		855		754		2, 742	
Mexicans	20		93		772		885	
Kanakas	2		12		7		21	
Puerto Ricans			7		6		13	
Negroes			2		30		32	
Koreans	16		2		1		19	
Total	9, 373		5, 953		7, 251		22, 577	
PRODUCTS								
Salmon:								
Canned ... cases	2, 538, 936	$10, 167, 122	1, 681, 554	$8, 652, 949	1, 183, 249	$10, 276, 221	5, 403, 739	$29, 096, 292
Mild cured ... pounds	3, 243, 200	626, 291	16, 800	1, 425	60, 800	6, 037	3, 320, 800	633, 753
Pickled ... do	77, 800	6, 121	354, 450	31, 161	708, 950	66, 226	1, 141, 200	103, 508
Fresh ... do	768, 619	55, 918					768, 619	55, 918
Frozen ... do	6, 160, 117	411, 171	22, 800	644			6, 182, 917	411, 815
Dry-salted, dried, and smoked ... do	7, 600	380	9, 450	945	1, 265, 126	76, 935	1, 282, 176	78, 260
Smoked and packed in olive oil ... cases	111	999					111	999
Pudding ... do			148	950			148	950
Eggs for caviar ... pounds					4, 100	500	4, 100	500
Fertilizer ... do	1, 020, 000	20, 040	565, 288	9, 054			1, 585, 288	29, 094
Oil ... gallons	29, 000	3, 770	25, 980	8, 542			54, 980	12, 312
Halibut:								
Fresh ... pounds	13, 681, 622	942, 135	117, 070	8, 948	12, 588	496	13, 811, 280	951, 579
Frozen ... do	5, 337, 364	335, 725	1, 157, 737	57, 019	116, 812	8, 177	6, 611, 913	400, 921
Cheeks, frozen ... do			2, 032	102			2, 032	102
Pudding ... cases			17	85			17	85
Herring:								
Fresh, for bait ... pounds	1, 910, 100	26, 763	946, 762	12, 469	29, 250	351	2, 886, 112	39, 583
Frozen, for bait ... do	4, 675, 060	36, 566	46, 625	746			4, 721, 685	37, 312
Frozen, for food ... do					236, 500	9, 460	236, 500	9, 460
Pickled, for food:								
Scotch cure ... do	1, 759, 475	107, 097	2, 960, 350	167, 217	3, 291, 225	199, 493	8, 011, 050	473, 807
Norwegian cure ... do	200	15	29, 500	2, 006	130, 800	8, 790	160, 500	10, 811

Roused, for food (bloater stock)	do					92, 400	4, 266	92, 400	4, 266
Spiced	do	2, 000	250					2, 000	250
Dry-salted	do					73, 050	3, 000	73, 050	3, 000
Meal	do	14, 000, 276	242, 736	1, 822, 700	30, 089			15, 822, 976	272, 825
Oil	gallons	1, 910, 242	334, 246	242, 464	42, 336			2, 152, 706	376, 582
Cod:									
Dry-salted	pounds			58, 800	2, 702	90, 000	4, 500	148, 800	7, 202
Stockfish	do			119, 300	11, 930			119, 300	11, 930
Pickled	do			146, 398	4, 471			146, 398	4, 471
Tongues	do			400	47			400	47
Clams:									
Canned	cases	1, 486	8, 906	40, 793	303, 468			42, 279	312, 374
Juice	do	13	33					13	33
Whole in shell	dozen			100	50			100	50
Crabs:									
Canned	cases			263	2, 104			263	2, 104
Meat	pounds	56, 271	21, 600	43, 686	17, 478			99, 957	39, 078
Whole in shell	dozen	202	404	320	480			522	884
Shrimp:									
Meat	pounds	457, 005	183, 950	400	100			457, 405	184, 050
Whole in shell	do	1, 645	247	1, 000	150			2, 645	397
Trout:									
Canned	cases	72	576					72	576
Fresh	pounds	34, 552	3, 011	21, 400	2, 422			55, 952	5, 433
Frozen	do	21, 786	738	5, 936	419			27, 722	1, 157
Pickled	do	400	36					400	36
Sablefish:									
Fresh	do	1, 110	30					1, 110	30
Frozen	do	278, 235	13, 256					278, 235	13, 256
Smelt: Fresh	do			1, 340	80			1, 340	80
Rockfishes:									
Fresh	do	4, 451	134					4, 451	134
Frozen	do	18, 468	543					18, 468	543
"Lingcod," frozen	do	526	16					526	16
Flounders:									
Fresh	do	210, 000	5, 250					210, 000	5, 250
Frozen	do	65, 172	1, 637					65, 172	1, 637
Total			13, 557, 712		9, 372, 588		10, 664, 452		[1] 33, 594, 752

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[1] These figures represent the value of the manufactured product. It is estimated that the value of the catch to the fishermen was approximately $10,043,000. The round weight of the salmon catch landed by the fishermen was approximately 467,664,391 pounds, and the corresponding figures for herring were approximately 103,566,888 pounds. The cod figures given above do not include the offshore catch from waters adjacent to Alaska, which amounted to 3,352,011 pounds of dry-salted cod, having a total value of $220,129, landed at ports of the Pacific Coast States.

SALMON

Notwithstanding a considerable reduction in the amount of fishing gear used in the southeast and central districts, in accordance with the purpose of cannery men to curtail operations because of the unsatisfactory market, the yield of salmon in Alaska was on about the usual level. Of the five species of salmon, only one—the red salmon—showed an increased catch for 1931, as compared with the preceding year. This was due primarily to the abundance of fish in the Bristol Bay area, particularly on the east side of the bay. The runs of reds along the Alaska Peninsula and in the Chignik and Karluk Rivers also showed a marked improvement, while in southeastern Alaska there was a decline in the catch of this species. Although there was a marked decrease in the number of pink salmon taken, its effect was largely offset by the greater size of the individual fish, which averaged about one-third larger than in 1930.

The total catch of salmon decreased approximately 11 per cent from that of 1930. By districts, southeastern Alaska showed a decrease of 35 per cent and central Alaska 7 per cent, while the western district gained approximately 161 per cent.

There was a decrease of 30 per cent in the number of fathoms of seines and 5 per cent in the number of fathoms of gill nets used in Alaska in 1931, as compared with the previous year, while traps decreased 32 per cent.

CATCH AND APPARATUS

The total number of seines used in the salmon industry in 1931 was 556, of which number 417 were purse seines and 139 beach seines. The purse seines aggregated 65,123 fathoms of webbing, and the beach seines 15,939 fathoms. The number of gill nets used was 4,504, having a total length of 261,625 fathoms. There were 219 driven and 259 floating traps—a total of 478.

Southeastern Alaska was accredited with 292 seines, or a total of 51,808 fathoms of webbing, a decrease of 129 seines and 21,531 fathoms of webbing from the number used in 1930; also with 315 gill nets, aggregating 18,260 fathoms, a decrease of 46 nets and 3,105 fathoms of webbing; and with 40 driven and 234 floating traps, a decrease of 23 driven and 147 floating traps from the number operated in 1930.

Corresponding figures for central Alaska show 257 seines, or 28,149 fathoms, as compared with 354 seines, or 39,168 fathoms in 1930; 1,826 gill nets, or 82,523 fathoms, as compared with 2,555 gill nets, or 119,990 fathoms in 1930; and 177 driven and 25 floating traps, as compared with 213 driven and 42 floating traps in 1930.

In western Alaska 7 seines, or 1,105 fathoms of webbing, were used, a decrease from 1930 of 14 seines and 2,785 fathoms of webbing. There were 2,363 gill nets used, or an aggregate of 160,842 fathoms, an increase of 179 nets and 27,582 fathoms of webbing. As in 1930, two driven traps were operated in this district.

Seines caught 20 per cent of the salmon taken in 1931; gill nets, 25 per cent; and traps, 53 per cent; while lines and wheels took the remaining 2 per cent.

Percentage of salmon caught in each Alaska district, by principal forms of apparatus

Apparatus	Southeast Alaska		Central Alaska		Western Alaska	
	1930	1931	1930	1931	1930	1931
Seines	27	22	30	28	5	5
Gill nets	2	2	10	9	87	92
Traps	69	73	60	63	1	
Lines	2	3				
Wheels					7	3

The total catch of salmon in 1931 was 73,848,682, a decrease of 8,892,950, or about 11 per cent, from the number taken in 1930. There was a decrease of 17,858,031 in southeastern Alaska and 1,672,833 in central Alaska, while the western district gained 10,637,914. The catch by species shows that cohos decreased 1,894,278, chums 28,464, pinks 19,002,286, and kings 212,608, while reds increased 12,244,686.

Salmon taken in 1931, by apparatus and species, in each geographic section of Alaska

Apparatus and species	Southeast Alaska	Central Alaska	Western Alaska	Total
Seines:				
Coho, or silver	131, 845	78, 501		210, 346
Chum, or keta	1, 131, 713	912, 797	42, 925	2, 087, 435
Pink, or humpback	5, 785, 656	4, 829, 858		10, 615, 514
King, or spring	780	386	1, 556	2, 722
Red, or sockeye	496, 929	653, 759	742, 198	1, 892, 886
Total	7, 546, 923	6, 475, 301	786, 679	14, 808, 903
Gill nets:				
Coho, or silver	188, 298	274, 385	1, 219	463, 902
Chum, or keta	7, 892	30, 759	1, 064, 380	1, 103, 031
Pink, or humpback	159, 763	277, 523	5	437, 291
King, or spring	27, 550	51, 769	83, 347	162, 666
Red, or sockeye	379, 500	1, 324, 566	14, 790, 373	16, 494, 439
Total	763, 003	1, 959, 002	15, 939, 324	18, 661, 329
Traps:				
Coho, or silver	386, 703	517, 961		904, 664
Chum, or keta	1, 711, 141	1, 256, 314	8, 171	2, 975, 626
Pink, or humpback	21, 298, 111	9, 050, 799		30, 348, 910
King, or spring	8, 605	55, 511	964	65, 080
Red, or sockeye	946, 656	3, 752, 560	63, 670	4, 762, 886
Total	24, 351, 216	14, 633, 145	72, 805	39, 057, 166
Lines:				
Coho, or silver	445, 253			445, 253
King, or spring	423, 260			423, 260
Total	868, 513			868, 513
Wheels:				
Chum, or keta			426, 228	426, 228
King, or spring			26, 543	26, 543
Total			452, 771	452, 771
Total:				
Coho, or silver	1, 152, 099	870, 847	1, 219	2, 024, 165
Chum, or keta	2, 850, 746	2, 199, 870	1, 541, 704	6, 592, 320
Pink, or humpback	27, 243, 530	14, 158, 180	5	41, 401, 715
King, or spring	460, 195	107, 666	112, 410	680, 271
Red, or sockeye	1, 823, 085	5, 730, 885	15, 596, 241	23, 150, 211
Grand total	33, 529, 655	23, 067, 448	17, 251, 579	73, 848, 682

CANNING

CHANGES IN CANNERIES

Few changes were made in the ownership and operation of Alaska salmon canneries in 1931 as compared with such transactions in other recent years. There was, however, considerable consolidation of effort in the interest of economy, and several of the canneries that remained closed during the season had their catches of fish packed at other plants.

New organizations were formed by independent trap owners of Ketchikan under the names of the United Salmon Packers (Inc.) and the Ketchikan Packing Co. to lease and operate the Skowl Arm plant of the Straits Packing Co. and the Sunrise cannery of the Stuart Corporation, respectively. In connection with the latter there was an option to purchase, and ownership of the plant was transferred toward the close of the year. The floating plant *Pioneer*, which the Stuart Corporation sold to the Far North Fisheries (Inc.) in 1927, was repossessed by the former company in 1929. The vessel had been moved to Hydaburg, where it was raised on the beach and operated as a shore cannery for several years, but in 1931 it was refloated and moored to a dock at Ketchikan.

The floating cannery *International*, belonging to the International Packing Co., was operated at Sand Point under contract by a new concern, Unga Fisheries Co., a subsidiary of the Alaska Pacific Salmon Corporation. A pack of canned salmon was put up by the Associated Fishermen of Alaska in the Bristol Bay region aboard the *Santa Flavia*, which had formerly been operated under the name of the Alaska Fishermen's Cooperative Packing Co. Each of these floating canneries had been used in both central and western Alaska in 1930, but in 1931 their activities were confined to one district—the *International* operating in central Alaska, and the *Santa Flavia* in the western district.

Two plants in the Bristol Bay area that had been idle in 1930—the (X) plant of the Alaska Packers Association at Kvichak Bay and the Libbyville plant of Libby, McNeill & Libby—were reopened and operated by their respective owners.

NEW CANNERIES

Only one new cannery, that of Albert and Josie Sandvik at Uganik, is included in the list of plants operated. This is a hand cannery which began operations in 1929, but was not listed as a cannery in that and the following year, as it had only a small output.

CANNERIES NOT OPERATED

Thirty-six canneries that had been operated in the previous year were closed in 1931. Of this number, 17 were in southeast Alaska, 16 in central, and 3 in western Alaska. The floating plant operated at Port Heiden by the Anvil Sea Food Corporation in 1930 was used in Puget Sound waters in 1931. The steamer *Mazama*, of the Everett Packing Co., was not operated as a floating cannery in 1931 but was used as a supply ship for the Herendeen Bay Consolidated Canneries. There have been dropped from the list of inactive canneries the Heceta Island plant of the Nakat Packing Corporation, which has been dismantled, and the Kvichak Bay plant of the Alaska Salmon Co., which has been used as a saltery in recent years.

The following canneries were closed during the year, but may be reopened:

Southeastern Alaska:	
Alaska Pacific Fisheries	Burnett Inlet.
Alaska Pacific Salmon Corporation	Boca de Quadra. Chomly. Funter Bay. Pybus Bay. Tenakee.
Alaska Packers Association	Loring. Wrangell.
Alaska Sanitary Packing Co	Cape Fanshaw.
Columbia River Packers Association	Lake Bay.
Douglas Island Packing Co	Douglas.
Hetta Packing Co	Coppermount.
Hoonah Packing Co	Hoonah. Gambier Bay.
Libby, McNeill & Libby	Karheen. Klawak.
The Nakat Packing Corporation	Ketchikan.
New England Fish Co	Do.
Northwestern Fisheries Co	Hunter Bay. Kasaan. Santa Ana. Shakan.
Pacific American Fisheries	Ketchikan. Port Walter.
The Stuart Corporation (floating plant)	Ketchikan.
Wrangell Narrows Packing Co	Scow Bay.
Central Alaska:	
Alaska Pacific Salmon Corporation	Drier Bay.
Alaska Packers Association	Kasilof.
Blue Island Packing Co.	Blue Fox Bay.
W. G. Culver	Point McManus.
Kadiak Fisheries Co	Shearwater Bay.
Katmai Packing Co	Uzinki.
Kenai River Packing Co	Kenai.
Kustatan Packing Co	Kustatan.
New England Fish Co.	Drier Bay.
North Pacific Fisheries (Inc.) (floating plant)	Uyak Bay.
Pacific American Fisheries	Bering River. Ikatan. Unakwik Inlet.
Charles W. Pajoman	Iron Creek.
Port Williams Packing Corporation	Port Williams.
Redoubt Bay Packing Co	Redoubt Bay.
Shepard Point Packing Co	Port Ashton.
Harvey J. Smith	West Foreland.
Sunset Packing Co	Otter Creek.
J. F. Toman Packing Co	Anchorage.
John Wik	Kenai.
Jake Young	Port Chatham.
Western Alaska:	
Alaska Packers Association	Naknek River. Nushagak Bay.
Red Salmon Canning Co	Naknek River. Ugashik River.

TOTAL CANNERIES OPERATED

There were 116 canneries operated in Alaska in 1931—40 in southeastern, 51 in central, and 25 in western—which is 17 less in southeastern, 15 less in central, and 1 less in the western district than in 1930, a net decrease of 33 plants.

Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1931

[New canneries indicated by (*)]

Company	Canneries		Traps		
	Number	Location	Driven	Floating	Total
Southeast Alaska:					
Alaska Pacific Salmon Corporation	4	Funter Bay [1]	------	15	15
		Kake	------	10	10
		Ketchikan	4	4	8
		Port Althorp	------	11	11
		Rose Inlet	------	6	6
Annette Island Packing Co	1	Metlakatla	5	1	6
Astoria & Puget Sound Canning Co	1	Excursion Inlet	1	7	8
Bayview Packing Co	1	Klawak	------	------	------
Beegle Packing Co	1	Ketchikan	------	4	4
Demmert Packing Co	1	Klawak	------	------	------
Diamond K Packing Co	1	Wrangell (floating)	------	3	3
Fidalgo Island Packing Co	2	Bay of Pillars	5	------	5
		Ketchikan	3	2	5
Haines Packing Co	1	Letnikof Cove	------	------	------
P. E. Harris & Co	1	Hawk Inlet	------	7	7
Hood Bay Canning Co	1	Hood Bay	------	3	3
Icy Straits Fisheries (Inc.)	1	Hoonah (floating)	------	------	------
Independent Salmon Canneries (Inc.)	1	Ketchikan	------	------	------
Iwersen Packing Co	1	do	------	------	------
Ketchikan Packing Co	1	do	------	------	------
Libby, McNeill & Libby	4	Craig	------	15	15
		George Inlet	------	5	5
		Taku Harbor	6	8	14
		Yakutat	------	------	------
Nakat Packing Corporation, The	3	Hidden Inlet	------	6	6
		Union Bay	------	8	8
		Waterfall	------	9	9
New England Fish Co	3	Chatham	2	3	5
		Ketchikan [1]	------	2	2
		Noyes Island	------	6	6
		Yakutat (floating)	------	------	------
Northwestern Fisheries Co	2	Boca de Quadra	5	8	13
		Dundas Bay	------	3	3
Pacific American Fisheries	1	Excursion Inlet	3	2	5
		Ketchikan [1]	2	2	4
Peril Straits Packing Co	1	Todd	------	5	5
Petersburg Packing Co	1	Petersburg	3	7	10
Pyramid Packing Co. (Inc.)	1	Sitka	------	3	3
Sebastian-Stuart Fish Co	1	Tyee	------	6	6
Superior Packing Co	1	Tenakee	------	4	4
United Salmon Packers (Inc.)	1	Skowl Arm	------	------	------
Ward's Cove Packing Co	1	Ward Cove	------	3	3
Wrangell Packing Corporation	1	Wrangell	------	------	------
Central Alaska:					
Alaska Packers Association	3	Alitak	4	------	4
		Chignik	2	------	2
		Karluk	4	------	4
Alaska Year-Round Canneries Co	1	Seldovia	5	------	5
Alitak Fish Co	2	Alitak	4	------	4
		Zachar Bay	2	------	2
Anderson Mercantile Co. (Inc.)	1	Deep Creek	1	------	1
Columbia River Packers Association	1	Chignik	4	------	4
Cook Inlet Packing Co	1	Seldovia	6	------	6
Copper River Packing Co	1	McClure Bay	------	8	8
Cordova Packing Co	1	Cordova	------	------	------
H. J. Emard	1	Anchorage	4	------	4
Farwest Fisheries (Inc.)	1	do	5	------	5
Fidalgo Island Packing Co	1	Port Graham	8	------	8
Glacier Packing Co	1	Cordova (floating)	------	------	------
Grimes Packing Co	1	Uzinki	------	------	------
Gustan & Vogel	1	Point Possession	2	------	2
P. E. Harris & Co	1	False Pass	8	------	8
Kadiak Fisheries Co	1	Kodiak	4	------	4
Libby, McNeill & Libby	1	Kenai	18	------	18
New England Fish Co	1	Cordova	4	1	5
A. N. Nilson	1	Portlock	------	------	------
Ninilchik Packing Co	1	Ninilchik	1	------	1
North Coast Packing Co	1	do	4	------	4
Northern Light Packing Co	1	Mountain Slough	------	------	------
Northwestern Fisheries Co	4	Chignik	2	------	2
		Kenai	10	------	10
		Orca	------	6	6
		Uyak	------	------	------

[1] Traps only were operated, the fish being packed at other canneries.

Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1931—Continued

[New canneries indicated by (*)]

Company	Canneries		Traps		
	Number	Location	Driven	Floating	Total
Central Alaska—Continued.					
Pacific American Fisheries	2	King Cove	16	-	16
		Valdez	4	-	4
Pioneer Packing Co	1	Cordova	2	1	3
Pioneer Sea Foods Co	1	Eyak River	-	-	-
Point Possession Fish Co	1	Point Possession	1	-	1
Premier Salmon Co	1	Orca Bay	2	1	3
Albert & Josie Sandvik	1	Uganik Village *	-	-	-
E. Sandvik	1	Swansons Creek	-	-	-
San Juan Fishing & Packing Co	3	Evans Bay	2	2	4
		Tutka Bay	3	-	3
		Uganik Bay	3	-	3
Seashore Packing Co	1	Kukak Bay	-	-	-
Seward Fisheries (Inc.)	1	Seward	-	-	-
Shelikof Packing Co	1	Zachar Bay	-	-	-
Shepard Point Packing Co	1	Shepard Point	-	5	5
Shumagin Packing Co	1	Squaw Harbor	2	-	2
Snug Harbor Packing Co	1	Snug Harbor	8	-	8
Spur Fish Corporation	1	Nikishka Bay	-	-	-
Toman Packing Co	-	Anchorage [1]	1	-	1
Trinity Packing Co	1	Three Saints Bay	-	-	-
Uganik Fisheries (Inc.)	1	Uganik	3	-	3
Unga Fisheries Co	1	Sand Point (floating)	1	-	1
West Coast Canning Co	1	Tuxedna Bay	-	-	-
Western Alaska:					
Alaska Packers Association	7	Egegik River	-	-	-
		Kvichak Bay (2)	-	-	-
		Naknek River (2)	-	-	-
		Nushagak Bay	-	-	-
		Ugashik River	-	-	-
Alaska-Portland Packers Association	2	Naknek River	-	-	-
		Nushagak Bay	-	-	-
Alaska Salmon Co	1	Wood River	-	-	-
Associated Fishermen of Alaska (Inc.)	1	Nushagak Bay and Naknek River (floating).	-	-	-
Bristol Bay Packing Co	1	Kvichak Bay	-	-	-
Columbia River Packers Association	1	Nushagak Bay	-	-	-
Herendeen Bay Consolidated Canneries	1	Herendeen Bay	-	-	-
Libby, McNeill & Libby	6	Egegik River	-	-	-
		Ekuk	-	-	-
		Koggiung	-	-	-
		Libbyville	-	-	-
		Lockanok	-	-	-
		Nushagak	-	-	-
Nakat Packing Corporation, The	1	Nakeen	-	-	-
Northwestern Fisheries Co	2	Naknek River	-	-	-
		Nushagak	-	-	-
Pacific American Fisheries	1	Port Moller	2	-	2
Red Salmon Canning Co	1	Naknek River	-	-	-

[1] Traps only were operated, the fish being packed at other canneries.

LOSSES AND DISASTERS

Reported property losses in the salmon industry in Alaska in 1931 totaled $101,346. In southeastern Alaska an Oriental bunk house was burned and miscellaneous fishing equipment and small boats were lost, the total value of which amounted to $18,564. The plant of the Trinity Packing Co. at Three Saints Bay, together with the cannery dock and part of the season's pack of canned salmon, was destroyed by fire. The loss was $21,600. Other losses in the central district included the cannery tender *Edna G*, a number of small boats, and fishing gear, having a total value of $26,084. In the western district losses aggregated $35,098, consisting of nets, small boats, cannery supplies, a bunk house, and the tender *Oregonian*, which sank with a load of some 10,000 red salmon.

Twenty-one lives were lost—5 in southeastern Alaska, 5 in central, and 11 in the western district. In southeastern Alaska 2 fishermen were drowned, 2 shoresmen were accidentally killed, and 1 shoresman died of disease. One fisherman, 1 transporter, and 2 shoresmen died of disease and 1 fisherman was drowned in the central district. In western Alaska 3 shoresmen and 5 fishermen died of disease, and 2 shoresmen and 1 fisherman met accidental death.

STATISTICS

In 1931, 116 canneries were operated in Alaska, 33 less than in 1930. Employment was given to 18,158 persons, as compared with 22,324 in 1930, a decrease of 4,166. White employees decreased 2,099; natives, 273; Chinese, 100; Japanese, 265; Filipinos, 1,493; Kanakas, 10; Puerto Ricans, 8; Negroes, 58; and miscellaneous (Koreans, etc.), 10; while Mexicans increased 150.

The total pack of canned salmon was 5,403,739 cases, valued at $29,096,292. This was an increase of 371,413 cases, or a little more than 7 per cent, over the pack of 1930 and a decrease in value of $598,606, or about 2 per cent. The output in southeastern Alaska decreased from 2,977,286 to 2,538,936 cases, or nearly 15 per cent, while there was an increase in central Alaska from 1,618,545 to 1,681,554 cases, or about 4 per cent, and in western Alaska from 436,495 to 1,183,249 cases, or 171 per cent. In Alaska as a whole the pack of reds increased from 851,514 to 1,694,278 cases, or 99 per cent, while cohos decreased from 332,422 to 169,878 cases, or 49 per cent; chums from 599,934 to 533,856 cases, or 11 per cent; pinks from 3,188,534 to 2,953,860 cases, or 7 per cent; and kings from 59,922 to 51,867 cases, or 13 per cent.

Data are included in the following tables to show comparison of the 1931 pack with the average for the five preceding years, 1926 to 1930, by cases of each species and by districts. Two species—pinks and reds—show a gain over the 5-year average, while cohos, chums, and kings show a decline. By districts the pack in central Alaska decreased 7 per cent, while in southeastern and western Alaska there were increases of approximately 4 and 8 per cent, respectively, making a net gain for all of Alaska of 1 per cent over the 5-year average.

Persons engaged, wages paid, and operating units of Alaska salmon canning industry, 1931

Items	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	820	1,079	1,744	3,643
Natives	1,104	430	252	1,786
Japanese	2			2
Filipinos	11			11
Mexicans	3			3
Kanakas	2			2
Total	1,942	1,509	1,996	5,447

Persons engaged, wages paid, and operating units of Alaska salmon canning industry, 1931—Continued

Items	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED—continued				
Shoresmen:				
Whites	1,245	1,208	1,603	4,056
Natives	1,215	444	82	1,741
Chinese	152	209	301	662
Japanese	336	335	290	961
Filipinos	1,110	842	752	2,704
Mexicans	10	92	772	874
Kanakas		12	7	19
Puerto Ricans		7	6	13
Negroes		2	30	32
Koreans	16	2	1	19
Total	4,084	3,153	3,844	11,081
Transporters:				
Whites	539	538	474	1,551
Natives	30	35		65
Chinese	3		4	7
Japanese	2	3		5
Filipinos			2	2
Total	574	576	480	1,630
Total:				
Whites	2,604	2,825	3,821	9,250
Natives	2,349	909	334	3,592
Chinese	155	209	305	669
Japanese	340	338	290	968
Filipinos	1,121	842	754	2,717
Mexicans	13	92	772	877
Kanakas	2	12	7	21
Puerto Ricans		7	6	13
Negroes		2	30	32
Koreans	16	2	1	19
Grand total	6,600	5,238	6,320	18,158
Wages paid shoresmen	$1,566,372	$1,412,621	$1,414,595	$4,393,588
Wages paid transporters	263,683	264,497	198,848	727,028
OPERATING UNITS				
Plants:				
Shore canneries	37	49	24	110
Floating canneries—				
Power vessels	2	1	1	4
Net tonnage	301	1,760	1,424	3,485
Barges	1	1		2
Net tonnage	488	389		877
Total plants operated	40	51	25	116
Vessels:				
Power, over 5 tons	328	167	88	583
Net tonnage	6,975	4,244	34,199	45,418
Launches	90	192	26	308
Power dories	26	42	1	69
Gill-net boats	97	107	1,039	1,243
Seine skiffs	92	228	10	330
Other rowboats and skiffs	827	678	163	1,668
Lighters and scows	234	250	140	624
Houseboats	21	5	30	56
Pile drivers	29	40	17	86
Pile pullers	7	5		12
Rigging scows	33	11		44
Apparatus:				
Purse seines	289	121	4	414
Fathoms	51,508	12,540	900	64,948
Beach seines	3	120		123
Fathoms	300	14,429		14,729
Gill nets	313	1,749	[1] 1,474	3,536
Fathoms	18,060	80,117	145,270	243,447
Traps, driven	40	177	2	219
Traps, floating	234	25		259

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[1] Includes 188 stake nets of an average length of 25 fathoms each, used in the Bristol Bay area.

Output and value of canned salmon in Alaska in 1931 [1]

Product	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Cases	Value	Cases	Value	Cases	Value	Cases	Value
Coho or silver:								
½-pound flat	7,907	$89,649	2,055	$16,104	-----	-----	9,962	$105,753
1-pound flat	2,663	20,239	239	1,670	-----	-----	2,902	21,909
1-pound tall	77,885	506,653	79,037	471,763	92	$556	157,014	978,972
Total	88,455	616,541	81,331	489,537	92	556	169,878	1,106,634
Chum or keta:								
½-pound flat	3,992	20,745	250	912	-----	-----	4,242	21,657
1-pound flat	-----	-----	35	140	-----	-----	35	140
1-pound tall	270,256	870,630	192,768	606,056	66,555	202,202	529,579	1,678,888
Total	274,248	891,375	193,053	607,108	66,555	202,202	533,856	1,700,685
Pink or humpback:								
½-pound flat	44,149	246,768	2,375	13,112	-----	-----	46,524	259,880
1-pound flat	2,242	8,849	2,168	7,805	-----	-----	4,410	16,654
1-pound tall	1,967,051	6,797,186	935,875	3,141,778	-----	-----	2,902,926	9,938,964
Total	2,013,442	7,052,803	940,418	3,162,695	-----	-----	2,953,860	10,215,498
King or spring:								
½-pound flat	4,648	55,133	7,751	93,677	809	8,090	13,208	156,900
1-pound flat	3,155	33,216	10,722	117,342	2,844	28,185	16,721	178,743
1-pound tall	7,093	46,476	9,126	65,671	5,719	39,597	21,938	151,744
Total	14,896	134,825	27,599	276,690	9,372	75,872	51,867	487,387
Red or sockeye:								
½-pound flat	13,596	217,725	36,483	458,175	8,099	100,215	58,178	776,115
1-pound flat	17,972	179,720	19,175	186,951	3,855	38,210	41,002	404,881
1-pound tall	116,327	1,074,133	383,495	3,471,793	1,095,276	9,859,166	1,595,098	14,405,092
Total	147,895	1,471,578	439,153	4,116,919	1,107,230	9,997,591	1,694,278	15,586,088
Grand total	2,538,936	10,167,122	1,681,554	8,652,949	1,183,249	10,276,221	5,403,739	29,096,292

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[1] Cases containing ½-pound cans have been reduced one-half in number, and thus, for the purpose of affording fair comparison, all are put upon the basis of forty-eight 1-pound cans to the case.

Output of canned salmon in Alaska, in cases, 1926 to 1931 [1]

BY SPECIES

Product	1926	1927	1928	1929	1930	Average for 5-year period, 1926–1930	1931	Percentage of increase or decrease in 1931, as compared with 5-year average
Coho or silver:								
¼-pound flat	-----	-----	-----	-----	371	74	-----	−100.00
½-pound flat	10,354	10,105	13,498	7,880	18,808	12,129	9,962	−17.86
1-pound flat	16,625	15,047	5,840	6,730	5,926	10,034	2,902	−71.08
1-pound tall	175,548	227,892	279,285	157,346	307,317	229,477	157,014	−31.58
Total	202,527	253,044	298,623	171,956	332,422	251,714	169,878	−32.51
Chum or keta:								
½-pound flat	1,367	9,414	5,057	4,961	8,384	5,837	4,242	−27.33
1-pound flat	48,982	1,449	4	-----	-----	10,087	35	−99.65
1-pound tall	852,094	496,860	990,724	859,551	591,550	758,156	529,579	−30.15
Total	902,443	507,723	995,785	864,512	599,934	774,080	533,856	−31.03

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[1] The number of cases shown has been put upon the common basis of forty-eight 1-pound cans per case.

Output of canned salmon in Alaska, in cases, 1926 to 1931—Continued

BY SPECIES—Continued

Product	1926	1927	1928	1929	1930	Average for 5-year period, 1926–1930	1931	Percentage of increase or decrease in 1931, as compared with 5-year average
Pink or humpback:								
¼-pound flat					1, 113	222		−100. 00
½-pound flat	59, 835	50, 455	40, 473	44, 762	81, 064	55, 318	46, 524	−15. 90
1-pound flat	82, 161	14, 662	6, 189	3, 910	4, 867	22, 358	4, 410	−80. 28
1-pound tall	3, 196, 353	1, 355, 658	2, 740, 580	2, 522, 985	3, 101, 490	2, 583, 413	2, 902, 926	+12. 37
Total	3, 338, 349	1, 420, 775	2, 787, 242	2, 571, 657	3, 188, 534	2, 661, 311	2, 953, 860	+10. 99
King or spring:								
½-pound flat	3, 324	10, 528	11, 782	16, 320	17, 840	11, 959	13, 208	+10. 44
1-pound flat	11, 125	11, 371	14, 854	26, 808	23, 686	17, 569	16, 721	−4. 83
1-pound tall	38, 027	48, 492	27, 523	28, 979	18, 396	32, 283	21, 938	−32. 04
Total	52, 476	70, 391	54, 159	72, 107	59, 922	61, 811	51, 867	−16. 09
Red or sockeye:								
¼-pound flat					370	74		−100. 00
½-pound flat	82, 181	88, 874	89, 063	100, 136	110, 605	94, 172	58, 178	−38. 22
1-pound flat	104, 329	57, 771	87, 100	75, 326	62, 972	77, 500	41, 002	−47. 09
1-pound tall	1, 970, 577	1, 173, 550	1, 771, 931	1, 514, 465	677, 567	1, 421, 618	1, 595, 098	+12. 20
Total	2, 157, 087	1, 320, 195	1, 948, 094	1, 689, 927	851, 514	1, 593, 364	1, 694, 278	+6. 33
Grand total	6, 652, 882	3, 572, 128	6, 083, 903	5, 370, 159	5, 032, 326	5, 342, 280	5, 403, 739	+1. 15

BY DISTRICTS AND SPECIES

Southeast Alaska:								
Coho or silver	96, 389	114, 970	145, 770	97, 847	155, 652	122, 126	88, 455	−27. 57
Chum or keta	618, 397	224, 433	570, 219	290, 797	283, 478	397, 465	274, 248	−31. 00
Pink or humpback	2, 158, 699	588, 291	2, 142, 838	1, 542, 615	2, 309, 976	1, 748, 484	2, 013, 442	+15. 15
King or spring	10, 679	8, 031	5, 522	7, 000	6, 939	7, 634	14, 896	+95. 13
Red or sockeye	173, 891	116, 468	106, 798	162, 952	221, 241	156, 270	147, 895	−5. 36
Total	3, 058, 055	1, 052, 193	2, 971, 147	2, 101, 211	2, 977, 286	2, 431, 979	2, 538, 936	+4. 40
Central Alaska:								
Coho or silver	104, 309	138, 034	152, 360	71, 330	173, 352	127, 877	81, 331	−36. 40
Chum or keta	243, 808	253, 197	377, 857	497, 774	284, 751	331, 477	193, 053	−41. 76
Pink or humpback	1, 144, 180	817, 538	643, 330	1, 025, 652	859, 761	898, 092	940, 418	+4. 71
King or spring	23, 683	43, 470	35, 036	35, 661	32, 060	33, 982	27, 599	−18. 78
Red or sockeye	630, 505	318, 864	430, 572	454, 086	268, 621	420, 530	439, 153	+4. 43
Total	2, 146, 485	1, 571, 103	1, 639, 155	2, 084, 503	1, 618, 545	1, 811, 958	1, 681, 554	−7. 20
Western Alaska:								
Coho or silver	1, 829	40	493	2, 779	3, 418	1, 712	92	−94. 63
Chum or keta	40, 238	30, 093	47, 709	75, 941	31, 705	45, 137	66, 555	+47. 45
Pink or humpback	35, 470	14, 946	1, 074	3, 390	18, 797	14, 735		−100. 00
King or spring	18, 114	18, 890	13, 601	29, 446	20, 923	20, 195	9, 372	−53. 59
Red or sockeye	1, 352, 691	884, 863	1, 410, 724	1, 072, 889	361, 652	1, 016, 564	1, 107, 230	+8. 92
Total	1, 448, 342	948, 832	1, 473, 601	1, 184, 445	436, 495	1, 098, 343	1, 183, 249	+7. 73
Grand total	6, 652, 882	3, 572, 128	6, 083, 903	5, 370, 159	5, 032, 326	5. 342, 280	5, 403, 739	+1. 15

Relative importance of each species of canned salmon within each district in 1931

District	Coho	Chum	Pink	King	Red	Total, all species
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Southeast Alaska	3.5	10.8	79.3	0.6	5.8	100
Central Alaska	4.8	11.5	55.9	1.7	26.1	100
Western Alaska	0	5.6	0	.8	93.6	100
All Alaska	3.1	9.9	54.7	1.0	31.3	100

Relative importance of each district in the production of each species of salmon canned in 1931

District	Coho	Chum	Pink	King	Red	Total, all species
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Southeast Alaska	52.0	51.4	68.2	28.7	8.7	47.0
Central Alaska	47.9	36.1	31.8	53.2	25.9	31.1
Western Alaska	.1	12.5	0	18.1	65.4	21.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

Average annual price per case of forty-eight 1-pound cans of salmon, 1921 to 1931

Product	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931
Coho, or silver	$5.63	$5.47	$5.74	$6.83	$9.72	$8.40	$8.51	$7.12	$7.59	$8.26	$6.51
Chum, or keta	3.68	3.98	4.65	4.68	4.44	5.01	5.47	6.06	5.35	3.60	3.19
Pink, or humpback	4.21	4.34	4.86	4.93	5.28	5.39	5.87	6.56	6.06	4.17	3.46
King, or spring	10.22	8.08	8.56	8.89	11.91	10.37	11.25	11.13	11.92	13.32	9.40
Red, or sockeye	8.96	9.24	9.27	9.53	13.12	9.89	12.08	9.41	10.71	12.57	9.20

PACK IN CERTAIN DISTRICTS

Statistics of the salmon pack are again presented for subdivisions of the three main districts of Alaska, and comparison is made with similar statistics for 1930. Where the pack at a given cannery is made up of fish from more than one district, as in the case of that at certain Cordova canneries which pack fish caught both in Prince William Sound and in the Copper River area or at various plants in southeastern Alaska which draw for their supply on the catch of more than one district, due segregation has been made in order to credit each district with the pack from salmon caught therein. These districts are described as follows:

WESTERN ALASKA

Bristol Bay.—The Bering Sea shore, east and north of the Ugashik River.

Port Moller and Herendeen Bay.—Port Moller, Herendeen Bay, and Nelson Lagoon.

CENTRAL ALASKA

Ikatan-Shumagin Islands.—False Pass, Ikatan Bay, King Cove, and the Shumagin Islands.

Chignik.—Canneries located at Chignik.

Kodiak-Afognak Islands.—Kodiak, Spruce, and Raspberry Islands.

Cook Inlet.—The shores of Cook Inlet.

Prince William Sound.—Extends from Resurrection Bay to Point Whitshed.

Copper and Bering Rivers.—Extends from Point Whitshed to Bering River.

SOUTHEASTERN ALASKA

Yakutat and Dry Bay.—Extends from Yakutat Bay to and including Dry Bay.

Icy Strait-Lynn Canal.—West coast of Baranof and Chichagof Islands, the shores of Cross Sound, Icy Strait, Lynn Canal, and Stephens Passage, south to Taku Harbor.

Chatham Strait-Frederick Sound.—Both shores of Chatham Strait and its bays from Point Augusta to Cape Ommaney, and through Frederick Sound and its bays northward to Taku Harbor, including Kake.

Sumner Strait-Dixon Entrance.—Extends southward from Petersburg and eastward from Port Beauclerc to Cape Chacon and Dixon Entrance and includes all canneries on the mainland and intervening islands from the Stikine River to Portland Canal.

West coast, Prince of Wales Island.—Territory west and south of a line from Cape Chacon to Point Baker and Cape Ommaney.

Pack of canned salmon in Alaska in 1931, by districts [1]

District	Coho	Chum	Pink	King	Red	Total	Percentage of increase or decrease from 1930
	Cases	*Cases*	*Cases*	*Cases*	*Cases*	*Cases*	
Bristol Bay	92	61,721	--------	8,901	1,048,917	1,119,631	+173.93
Port Moller and Herendeen Bay	--------	4,834	--------	471	58,313	63,618	+171.83
Ikatan-Shumagin Islands	12,020	106,606	66,259	2,817	142,773	330,475	−38.38
Chignik	4,286	4,018	11,259	269	67,291	87,123	+560.57
Kodiak-Afognak Islands	15,880	16,174	454,177	395	90,657	577,283	+206.74
Cook Inlet	30,231	5,513	31,356	13,180	58,055	138,335	−31.90
Prince William Sound	6,283	60,742	377,367	232	20,897	465,521	−12.77
Copper and Bering Rivers	12,631	--------	--------	10,706	59,480	82,817	−44.19
Yakutat and Dry Bay	32,337	616	3,760	4,303	25,781	66,797	−8.52
Icy Strait-Lynn Canal	13.469	62,475	475,984	2,677	43,789	598,394	−36.13
Chatham Strait-Frederick Sound	7,464	50,851	532,609	1,072	8,448	600,444	+1.80
Sumner Strait-Dixon Entrance	19,237	104,058	683,180	380	45,790	852,645	−16.59
West coast, Prince of Wales Island	15,948	56,248	317,909	6,464	24,087	420,656	+18.41
Total	169,878	533,856	2,953,860	51,867	1,694,278	5,403,739	+7.38

[1] Pack reduced to the basis of forty-eight 1-pound cans per case.

MILD CURING

The output of mild-cured salmon in Alaska was the smallest for any year since 1921, due primarily to unfavorable market conditions. Beginning early in June the trollers suspended operations for several weeks in an attempt to obtain higher prices. Their action failed in its purpose. A few fishermen reaped a good harvest during the period, and when the others resumed operations the early run of kings was virtually over.

Although there is shown a larger number of persons engaged in the industry, as well as of boats and lines operated, this increase is attributable to the more complete figures obtained in the enumeration of the trolling fleet by the bureau's employees, rather than to a gain in the extent of trolling operations. Eighteen plants were operated—17 in southeastern and 1 in western Alaska, a net decrease of 2 plants from the number reported for 1930.

The total production of mild-cured salmon was 3,320,800 pounds valued at $633,753, a decrease of 1,126,725 pounds in quantity and $234,969 in value as compared with the output of 1930. The pack consisted of 194,800 pounds of cohos and 3,126,000 pounds of kings, or in units of 800-pound tierces, 243 tierces of cohos and 3,907 tierces of kings.

Persons engaged, wages paid, and operating units, Alaska salmon mild-curing industry, 1931

Item	Southeast Alaska	Western Alaska	Total
PERSONS ENGAGED			
Fishermen:			
Whites	796	3	799
Natives	404	20	424
Total	1,200	23	1,223
Shoresmen:			
Whites	78	2	80
Natives	3	11	14
Total	81	13	94
Transporters:			
Whites	11	-------	11
Natives	--------	2	2
Total	11	2	13
Grand total	1,292	38	1,330
Wages paid shoresmen	$56,072	$3,050	$59,122
Wages paid transporters	8,320	225	8,545

Item	Southeast Alaska	Western Alaska	Total
OPERATING UNITS			
Plants:			
Shore	14	1	15
Floating—			
Barges	3	-------	3
Net tonnage	720	-------	720
Total plants operated	17	1	18
Vessels:			
Power, over 5 tons	198	-------	198
Net tonnage	1,642	-------	1,642
Launches	683	1	684
Gill-net boats	--------	12	12
Rowboats and skiffs	118	-------	118
Lighters and scows	3	-------	3
Houseboat	1	-------	1
Apparatus:			
Gill nets	--------	16	16
Fathoms	--------	800	800
Lines	3,628	-------	3,628

Products of Alaska salmon mild-curing industry in 1931

Products	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Coho, or silver	[1] 178,000	$16,147	[2] 16,800	$1,425	--------	--------	[3] 194,800	$17,572
King, or spring	[4] 3,065,200	610,144	--------	--------	[5] 60,800	$6,037	[6] 3,126,000	616,181
Total	3,243,200	626,291	16,800	1,425	60,800	6,037	3,320,800	633,753

[1] 222 tierces. [2] 21 tierces. [3] 243 tierces. [4] 3,831 tierces. [5] 76 tierces. [6] 3,907 tierces.

PICKLING

A marked increase over the average for recent years was apparent in the pickled-salmon output in 1931, the production being the largest since 1926. This increase was due primarily to the excellent runs of red salmon in the Bristol Bay region. Although production was stimulated by reason of the light stocks of pickled reds on hand and the fairly firm prices at the beginning of the year, the market was affected by general adverse conditions as the season advanced, and the increase in quantity was not accompanied by an increase in value of the product.

The western district regained its customary place as the principal producing center, contributing 62 per cent of the total Alaska output of pickled salmon, as compared with 19 per cent in 1930. The central district increased its output of pickled reds over that for 1930, but there was a decided curtailment in the production of cohos, with the result that the total output for the district showed an appreciable decline. In southeastern Alaska there was a decline in the output of all species as compared with the preceding year.

One hundred and forty-three persons were engaged in the industry in 1931, an increase of 29 over the previous year, and the number of plants operated increased from 11 to 18, of which 1 was in southeastern, 8 were in central, and 9 in western Alaska. Production in southeastern Alaska decreased from 151,600 pounds in 1930 to 77,800 pounds in 1931, and in central Alaska from 544,100 to 354,450 pounds. In western Alaska there was an increase from 167,250 pounds in 1930 to 708,950 pounds in 1931. The total output in 1931 was 1,141,200 pounds valued at $103,508, as compared with 862,950 pounds valued at $103,641 in 1930—an increase of approximately 32 per cent in quantity and a decrease of 0.1 per cent in value.

Persons engaged, wages paid, and operating units, Alaska salmon-pickling industry, 1931

Items	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	2	29	30	61
Natives	--------	5	31	36
Total	2	34	61	97
Shoresmen:				
Whites	--------	--------	18	18
Natives	--------	1	26	27
Total	--------	1	44	45
Transporter: White	--------	--------	1	1
Grand total	2	35	106	143
Wages paid shoresmen	--------	$54	$16,116	$16,170
Wages paid transporter	--------	--------	250	250
OPERATING UNITS				
Plants:				
Shore	1	8	7	16
Floating—				
Power vessel	--------	--------	1	1
Net tonnage	--------	--------	38	38
Scow	--------	--------	1	1
Total plants operated	1	8	9	18
Vessels:				
Power, over 5 tons	2	2	3	7
Net tonnage	26	12	46	84
Launches	--------	7	1	8
Power dories	--------	6	2	8
Gill-net boats	1	11	22	34
Seine skiffs	--------	10	1	11
Rowboats	1	12	10	23
Lighters and scows	1	--------	3	4
Apparatus:				
Purse seines	--------	3	--------	3
Fathoms	--------	175	--------	175
Beach seines	--------	13	3	16
Fathoms	--------	1,005	205	1,210
Gill nets	2	77	83	162
Fathoms	200	2,406	4,120	6,726
Wheels	--------	--------	3	3

Products of Alaska salmon-pickling industry in 1931

Species	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Coho, or silver	36,400	$3,052	121,550	$9,701	800	$60	158,750	$12,813
Chum, or keta	--------	--------	2,600	156	25,910	1,582	28,510	1,738
Pink, or humpback	23,800	1,399	14,400	913	--------	--------	38,200	2,312
King, or spring	3,600	270	17,800	1,950	99,540	10,459	120,940	12,679
Red, or sockeye	14,000	1,400	198,100	18,441	582,700	54,125	794,800	73,966
Total	77,800	6,121	354,450	31,161	708,950	66,226	1,141,200	103,508

FRESH SALMON

Operations in the fresh-salmon business in 1931 were carried on only in southeastern Alaska and were for the most part incidental to the mild curing of salmon. Three dealers whose chief product was fresh salmon gave employment to five white shoresmen. The total production was 768,619 pounds, valued at $55,918, against 1,295,216 pounds valued at $117,620 in 1930—a decrease of approximately 41 per cent in quantity and 52 per cent in value.

Products of the Alaska fresh-salmon industry in 1931

Species	Pounds	Value
Coho, or silver	64,495	$1,538
Chum, or keta	168	2
Pink, or humpback	28	1
King, or spring	703,907	54,376
Red, or sockeye	21	1
Total	768,619	55,918

FREEZING

The production of frozen salmon, although somewhat less than the record output of 1930, was well above the average for recent years. As usual, the bulk of the product was handled at the six cold-storage plants in southeastern Alaska. Two of these plants, whose chief product was frozen salmon, gave employment to 22 white shoresmen. The total output in 1931 was 6,182,917 pounds, valued at $411,815—a decrease of about 7 per cent in quantity and 27 per cent in value from the production in 1930, when 6,614,206 pounds, valued at $561,848, were prepared.

FILLETING

Included in the frozen-salmon product are 190,818 pounds of fillets, consisting of 3,674 pounds of cohos, valued at $441; 262 pounds of chums, valued at $24; and 186,882 pounds of pinks, valued at $18,688, prepared at Ketchikan for shipment to the Atlantic Coast Fisheries Co. This is not the first season for the handling of this product in Alaska, as a fair quantity had been prepared at Ketchikan in 1928, which was said to have had a ready sale in the eastern market.

Products of the frozen-salmon industry in 1931

Species	Southeast Alaska		Central Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Coho, or silver	[1] 3,021,511	$194,808	22,800	$644	[1] 3,044,311	$195,452
Chum, or keta	[2] 316,551	11,673			[2] 316,551	11,673
Pink, or humpback	[3] 369,475	22,171			[3] 369,475	22,171
King, or spring	2,450,089	182,390			2,450,089	182,390
Red, or sockeye	2,491	129			2,491	129
Total	6,160,117	411,171	22,800	644	6,182,917	411,815

[1] Includes 3,674 pounds of fillets, valued at $441.
[2] Includes 262 pounds of fillets, valued at $24.
[3] Includes 186,882 pounds of fillets, valued at $18,688.

DRY-SALTED, DRIED, SMOKED, AND OTHER MISCELLANEOUS SALMON PRODUCTS

Small quantities of dry-salted salmon were prepared in southeastern and western Alaska at two plants engaged primarily in the herring fishery. Two salmon salteries in central Alaska prepared kippered salmon in connection with their other operations, while in southeastern Alaska a plant that employed six white shoresmen was engaged in canning kippered salmon, of which product 111 cases, or 5,328 pounds, were packed.

In the fishery of the Yukon, Tanana, and Kuskokwim Rivers, which is carried on principally by natives, 1,240,000 pounds of chum salmon were dried, valued at $74,600; and in addition 576 pounds of beleke from kings, valued at $115, and 700 pounds of kippered kings, valued at $100, were prepared. In this western district 12 whites and 610 natives engaged in the fishery, and the apparatus used consisted of 256 wheels, 789 gill nets of 10,592 fathoms, 50 rowboats and skiffs, and 4 gill-net boats.

The production of miscellaneous salmon products incidental to the canning of salmon consisted of 70 cases (forty-eight 1-pound cans to the case) of fish pudding from coho salmon and 78 cases (forty-eight ½-pound cans to the case) from chums, with a total value of $950, in central Alaska, and 20½ barrels, or 4,100 pounds, of salmon eggs for caviar, valued at $500, in western Alaska.

Production of dry-salted, dried, smoked, and other miscellaneous salmon products in Alaska in 1931

Product	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Dry-salted:								
Coho, or silver	7,600	$380					7,600	$380
Red, or sockeye					23,850	$2,120	23,850	2,120
Total	7,600	380			23,850	2,120	31,450	2,500
Dried: Chum, or keta					1,240,000	74,600	1,240,000	74,600
Kippered:								
Coho, or silver			8,000	$800			8,000	800
Pink, or humpback			1,450	145			1,450	145
King, or spring					700	100	700	100
Total			9,450	945	700	100	10,150	1,045
Fish pudding:								
Coho, or silver			3,360	560			3,360	560
Chum, or keta			1,872	390			1,872	390
Total			5,232	950			5,232	950
Smoked and packed in olive oil: King, or spring	5,328	999					5,328	999
Beleke: King, or spring					576	115	576	115
Salmon eggs: Red, or sockeye					4,100	500	4,100	500
Grand total	12,928	1,379	14,682	1,895	1,269,226	77,435	1,296,836	80,709

BY-PRODUCTS

The preparation of salmon by-products was carried on at two plants in southeastern Alaska which were engaged solely in that business, giving employment to 22 white shoresmen and 6 white transporters. In central Alaska four salmon canneries manufactured salmon oil and fertilizer also, and a new reduction plant was established by the Alaska Salmon Meal & Oil Co. at Tiedeman Bay, although it was operated only a short time during the season. The total production was 1,585,288 pounds of fertilizer, valued at $29,094, and 54,980 gallons of oil, valued at $12,312, as compared with 2,283,882 pounds of fertilizer, valued at $51,674, and 55,883 gallons of oil, valued at $10,525, in 1930—a decrease of about 31 per cent in the amount of fertilizer and 2 per cent in the quantity of oil.

Production of salmon oil and fertilizer in Alaska in 1931

Disrtict	Oil		Fertilizer	
	Gallons	Value	Pounds	Value
Southeast Alaska	29,000	$3,770	1,020,000	$20,040
Central Alaska	25,980	8,542	565,288	9,054
Total	54,980	12,312	1,585,288	29,094

HERRING

A continuation of the generally low price levels on fishery products brought about a sharp curtailment in herring operations in Alaska in 1931, a number of the larger salting and reduction plants in the southeastern district remaining inactive throughout the year. Production of herring oil and meal fell far behind that of 1930, showing a net decrease of more than 18,000,000 pounds in quantity and $880,000 in value. The output of Scotch-cured herring, however, was on about the same scale as in the preceding year; southeastern Alaska increased the pack of this product considerably, while the central and western districts dropped somewhat behind 1930 figures.

The runs of herring were much lighter in the Prince William Sound and Kodiak districts than in 1930, and there was little or no betterment in the size and quality of the fish. No production is recorded for the Cook Inlet district, and the Golovin Bay output was considerably below the average for recent years. Herring of unusually large size and fine quality were quite abundant in the Aleutian Islands region. While most of the operations in this district were centered at Dutch Harbor, the motor ship *Donna Lane*, of the Utopian Fisheries (Inc.), and the schooner *Alice Cooke*, of the Kalgin Packing Co., were stationed in Akutan Bay, where they secured fair-sized packs of Scotch-cured fish. In the southeastern district herring were abundant, particularly toward the latter part of the season in the lower Chatham Strait region; and although small, they were of good quality for packing. Production of bait herring decreased considerably from that for 1930, and no importation of herring from British Columbia was reported.

The number of floating plants engaged in the herring industry remained the same as in 1930. The schooner *Alice Cooke*, owned by the Kalgin Packing Co., and the motorship *Donna Lane*, of the Utopian Fisheries (Inc.), were operated in both the central and western districts, while the schooner *Rosamond*, belonging to the North American Fisheries, was used exclusively in central Alaska.

Although many of the herring plants in southeastern Alaska were idle during the season, production of oil and meal was chiefly centered in this region, where all the reduction plants operated also produced Scotch-cured fish. The output of by-products in the southeastern district decreased from 19,502,823 pounds of meal and 2,943,915 gallons of oil in 1930 to 14,000,276 pounds of meal and 1,910,242 gallons of oil in 1931. Production of Scotch-cured herring in this district increased from 1,382,895 pounds in 1930 to 1,759,475 pounds in 1931.

In Central Alaska there was a slight decrease in the production of Scotch-cured herring, the pack amounting to 2,960,350 pounds, as compared with 3,011,375 pounds in 1930. The output of by-products in this district decreased very sharply from 3,908,200 pounds of meal and 601,507 gallons of oil in 1930 to 1,822,700 pounds of meal and 242,464 gallons of oil in 1931. This curtailment in the output of by-products was due to the reluctance of operators to manufacture meal and oil at the prevailing low prices, rather than to scarcity of fish.

The Scotch-cured pack of western Alaska fell somewhat below that of 1930. In that year 3,686,975 pounds were produced, as compared with 3,291,225 pounds in 1931.

Twenty concerns handled herring in southeastern Alaska in 1931, a decrease of eight from the number engaged in the previous year. Five were cold-storage plants that froze herring for bait and eight engaged only in the production of herring for bait. Listed below are the companies that engaged in the curing and reduction of herring in this district:

Arentsen & Co	Big Port Walter.
Atlas Packing Corporation	Deep Cove.
Buchan & Heinen Packing Co	Port Armstrong.
Northwestern Herring Co	Port Conclusion.
Storfold & Grondahl Packing Co	Washington Bay.

In central Alaska 11 operators engaged in pickling herring, the bulk of the pack again being prepared in the Kodiak and Prince William Sound areas. Two concerns—one in Izhut Bay and the other in Falls Bay—produced bait herring only. The more important operators in the district were as follows:

Salteries:	
Apex Fish Co	Kodiak.
Albert Coel	Shuyak Harbor.
Kalgin Packing Co. (floating plant)	Prince William Sound and Kodiak.
North American Fisheries (floating plant)	Sitkalidak Strait.
Utopian Fisheries (Inc.) (floating plant)	Port Hobron.
Saltery and reduction plants:	
Chatham Strait Fish Co	Crab Bay.
Johnson Fisheries Co	Thumb Bay.
Port Benny Packing Co	Port Benny.

Of the following operators in the western Alaska district all but two were engaged in the fishery in the Aleutian Islands area and all produced pickled herring, chiefly Scotch cured:

Austnes & Rod	Unalaska.
Campbell & Dougal	Dutch Harbor.
Jordan Columbus	Do.
Conrad Packing Co	Golovin Bay.
Golovin Bay Packing Co	Do.
Hovland & Boe	Dutch Harbor.
Ed. Jacobsen & Co	Do.
Hans Johnson (floating plant)	Do.

Kalgin Packing Co. (floating plant)	Akutan.
C. P. Madsen & Soren Karlsen	Dutch Harbor.
James W. Manson	Do.
Olaf Olson	Do.
Polar Packing Co	Unalaska.
Utopian Fisheries (Inc.) (floating plant)	Akutan.

Property losses reported in the herring fishery consisted of the destruction by fire of the schooner *Alice Cooke*, valued at $10,000; and the loss of 300 barrels of herring, valued at $4,500, and miscellaneous items of fishing gear and small boats having a total value of $6,955. One fisherman lost his life by drowning.

Dr. George A. Rounsefell, aquatic biologist of the bureau, aided by two assistants, continued the study and investigations of the Alaska herring along the lines followed during the last several years. A small power vessel was purchased by the bureau in 1931 for Doctor Rounsefell's use during the fishing season, thus facilitating the field work.

STATISTICAL SUMMARY

Seven hundred and thirty persons were engaged in the Alaska herring industry in 1931, as compared with 1,413 in 1930, and the number of plants decreased from 39 to 29. Products of the fishery were valued at $1,227,896, a decrease of $905,781, or approximately 42 per cent from 1930, when the total value was $2,133,677. Scotch-cured herring decreased from 8,081,245 pounds in 1930 to 8,011,050 pounds in 1931, or about 1 per cent; herring for bait decreased from 9,298,140 to 7,607,797 pounds, or about 18 per cent; meal decreased approximately 32 per cent in quantity and 58 per cent in value; and oil decreased 39 per cent in quantity and 57 per cent in value, compared with the production for 1930.

Persons engaged, wages paid, and operating units, Alaska herring industry, 1931

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	211	80	42	333
Natives	1	2	11	14
Total	212	82	53	347
Shoresmen:				
Whites	143	110	74	327
Natives		18	24	42
Japanese			1	1
Total	143	128	99	370
Transporters: Whites		3	10	13
Grand total	355	213	162	730
Wages paid shoresmen	$75,682	$48,230	$21,916	$145,828
Wages paid transporters		1,068	10,588	11,656
OPERATING UNITS				
Plants:				
Shore	5	7	14	26
Floating—				
Power vessel			1	1
Net tonnage			1,597	1,597
Sailing vessels		2		2
Net tonnage		1,857		1,857
Total plants operated	5	9	15	29

Persons engaged, wages paid, and operating units, Alaska herring industry, 1931—Continued

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
OPERATING UNITS—continued				
Vessels:				
Power, over 5 tons	34	16	4	54
Net tonnage	998	453	88	1, 539
Launches	4	11	22	37
Gill-net boats			10	10
Seine skiffs	21	12	4	37
Other rowboats and skiffs	26	11	9	46
Lighters and scows	3			3
Pile drivers	2	1		3
Apparatus:				
Purse seines	36	14	1	51
Fathoms	5, 847	2, 283	173	8, 303
Beach seines		2		2
Fathoms		100		100
Gill nets			90	90
Fathoms			2, 425	2, 425
Pound seines	14	5	2	21
Pounds	2	12	1	15

Products of Alaska herring industry in 1931

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Fresh, for bait	1, 910, 100	$26, 763	946, 762	$12, 469	29, 250	$351	2, 886, 112	$39, 583
Frozen, for bait	4, 675, 060	36, 566	46, 625	746			4, 721, 685	37, 312
Frozen, for food					236, 500	9, 460	236, 500	9, 460
Pickled, for food:								
Scotch cure	1, 759, 475	107, 097	2, 960, 350	167, 217	3, 291, 225	199, 493	8, 011, 050	473, 807
Norwegian cure	200	15	29, 500	2, 006	130, 800	8, 790	160, 500	10, 811
Roused, for food (bloater stock)					92, 400	4, 266	92, 400	4, 266
Spiced	2, 000	250					2, 000	250
Dry salted					73, 050	3, 000	73, 050	3, 000
Meal	14, 000, 276	242, 736	1, 822, 700	30, 089			15, 822, 976	272, 825
Oil	[1] 14, 326, 815	334, 246	[2] 1, 818, 480	42, 336			[3] 16, 145, 295	376, 582
Total	36, 673, 926	747, 673	7, 624, 417	254, 863	3, 853, 225	225, 360	48, 151, 568	1, 227, 896

[1] 1,910,242 gallons.

[2] 242,464 gallons.

[3] 2,152,706 gallons.

HALIBUT

Several factors, the most important of which was the continued unsettled market, contributed to bring the production of halibut in Alaska substantially below that for 1930. During the first month of the season landings were negligible because of a dispute between vessel owners and fishermen over terms of the working agreement, and the suspension of operations pending its settlement, together with the shortening of the season in the fall in accordance with new treaty provisions, resulted in greatly reducing the time spent in fishing as compared with former seasons.

An interesting feature of the 1931 season was the organization of an association composed of vessel owners and fishermen to market their product independently. Doing business under the name of the United Pacific Fisheries, the association based its operations on a cooperative plan to pay the members for their fish at a fixed minimum price, with a pro rata distribution at intervals of any profit accruing from the sales. The experiment at first gave promise of being successful, operations being conducted on a large scale for nearly two months, but toward the end of April the association was unable to buy the heavy stocks of halibut concentrated at Seattle and elsewhere, and the open auction method of selling was resumed. Prices declined rapidly at this time, and later in the season they reached the lowest levels recorded for recent years.

The U. S. Coast Guard again maintained a patrol of the fishing grounds to render any needed assistance to vessels of the halibut fleet. No major disaster occurred during the season. Two men were lost at sea and one died from exposure as the result of a wreck. Of the Alaska fleet, the schooner *Northern* was destroyed by fire following an explosion in Sumner Strait; the *Monroe* was wrecked on a reef in the vicinity of Wingham Island and became a total loss; the *Little Venus* was blown ashore near Union Bay and badly damaged; and the *Akutan* was considerably damaged in going aground at Ketchikan. The Puget Sound schooners *Democrat* and *Marmot* were lost in the vicinity of Kodiak Island, the former sinking in deep water after striking a reef, and the latter being destroyed by fire. The *Kalart* was wrecked and lost off an island in the Gulf of Alaska.

Life-history studies of the Pacific halibut were continued under the direction of Dr. William F. Thompson of the International Fisheries Commission. The schooner *Dorothy* was again chartered for this work and covered more than 10,000 miles along the coasts of British Columbia and Alaska during the season. In addition to the biological investigations, statistical data on the commercial fishery were collected and analyzed as a basis for determining effective conservation measures. Additional regulatory powers were vested in the commission by the new treaty of May 9, 1930, between the Dominion of Canada and the United States for the preservation of the Northern Pacific halibut fishery, which treaty became effective May 9, 1931, with the formal exchange of ratifications at Ottawa. In the exercise of this authority the commission seeks to maintain a close contact with the industry through conferences with representatives of the vessel owners and fishermen. Public hearings were held at Seattle and Prince Rupert in November, at which time proposed new regulations were discussed.

STATISTICAL SUMMARY

Nine hundred and forty-six persons were engaged in the halibut industry in 1931, a decrease of 230 from the number reported for the preceding year, and the products totaled 20,425,633 pounds, valued at $1,352,687. This output represents the total fares of the Alaska halibut fleet, which comprises all American vessels landing more than one-half of their catch in Alaska or British Columbia ports rather than in the States. Landings of halibut in Alaska totaled 9,626,118 pounds, valued at $608,480. In 1930 the landings of the Alaska fleet were 31,557,084 pounds, valued at $2,991,400, while landings in Alaska totaled 11,408,984 pounds, valued at $863,089. Thus the decrease in fares of the Alaska fleet was 11,131,451 pounds, or approximately 35 per cent in quantity and 55 per cent in value, while landings at Alaska ports decreased 1,782,866 pounds, or about 16 per cent in quantity and 29 per cent in value from the preceding year.

Persons engaged, wages paid, and operating units, Alaska halibut industry, 1931

Items	Southeast Alaska	Central Alaska	Total
PERSONS ENGAGED			
Fishermen: Whites	815	--------	815
Shoresmen:			
Whites	106	15	121
Natives	6	--------	6
Filipinos	2	--------	2
Mexicans	2	--------	2
Total	116	15	131
Grand total	931	15	946

Items	Southeast Alaska	Central Alaska	Total
Wages paid shoresmen	$110,291	$11,138	$121,429
OPERATING UNITS			
Vessels:			
Power, over 5 tons	123	--------	123
Net tonnage	2,663	--------	2,663
Launches	17	--------	17
Dories	123	--------	123
Skates of lines	3,838	--------	3,838

Products of the Alaska halibut fishery in 1931

Products	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Fresh (including local)	13,681,622	$942,135	117,070	$8,948	12,588	$496	13,811,280	$951,579
Frozen	[1] 5,337,364	335,725	1,157,737	57,019	116,812	8,177	6,611,913	400,921
Cheeks, frozen	--------	--------	2,032	102	--------	--------	2,032	102
Pudding	--------	--------	[2] 408	85	--------	--------	408	85
Total	19,018,986	1,277,860	1,277,247	66,154	129,400	8,673	20,425,633	1,352,687

[1] Includes 52,417 pounds of frozen fillets, valued at $4,718.
[2] 17 cases (48 ½-pound cans to the case).

COD

The number of independent fishermen engaged in cod-fishing operations from shore stations in Alaska in 1931 was somewhat larger than in the preceding year, and the output also showed a considerable increase. In the offshore fishery, on the other hand, there was a marked curtailment of fishing effort, only four schooners being sent to Bering Sea, as compared with eight in 1930. These vessels were the *C. A. Thayer* (390 tons) operated by the Pacific Coast Codfish Co., the *Wawona* (413 tons) by the Robinson Fisheries Co., and the *Louise* (328 tons) and *William H. Smith* (496 tons) by the Union Fish Co. The products of the offshore fishery are not included in the following table because the vessels operate from and land their fares in ports of the Pacific Coast States.

There were 47 persons engaged in the cod fishery in 1931—6 more than in 1930. Operations were again centered in the Shumagin Islands region. Products aggregated 414,898 pounds valued at $23,650, as compared with 322,237 pounds valued at $16,789 in 1930. Products of the offshore fishery consisted of 3,352,011 pounds of dry-salted cod valued at $220,129, as against 5,963,204 pounds valued at $302,118 in 1930. The offshore fishery employed 147 persons, or 122 less than in the previous year.

Persons engaged, wages paid, and operating units, Alaska cod industry, 1931

Item	Central Alaska	Western Alaska	Total	Item	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				OPERATING UNITS—contd.			
Fishermen:				Vessels—Continued.			
Whites	44	2	46	Launch	1		1
Native		1	1	Power dories	40		40
				Rowboats	4	2	6
Total	44	3	47	Apparatus:			
				Trawl lines	36		36
OPERATING UNITS				Hooks	12,050		12,050
				Hand lines	61	5	66
Shore stations	11	1	12				
Vessels:							
Power, over 5 tons	1	1	2				
Net tonnage	15	14	29				

Products of Alaska cod industry in 1931

Item	Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Dry-salted cod	58,800	$2,702	90,000	$4,500	148,800	$7,202
Stockfish	119,300	11,930			119,300	11,930
Pickled cod	146,398	4,471			146,398	4,471
Tongues	400	47			400	47
Total	324,898	19,150	90,000	4,500	414,898	23,650

WHALES

For the first time since the first whaling plant was established in Alaska in 1907, there was a complete suspension of whaling operations there in 1931. A similar situation existed along the entire American coast of the North Pacific Ocean and was attributed to the low prices on whale oil, which made profitable operations impossible. The American Pacific Whaling Co. leased its dock and some of the buildings at Port Hobron to the Utopian Fisheries (Inc.) for use in the herring industry.

CLAMS

Conditions in the clam industry in 1931 were apparently much more favorable than in any other branch of the Alaska fisheries. The output showed a substantial increase over that for 1930, being the largest for any year since 1925, and there was no appreciable decrease in the unit prices. The larger pack was attributed partly to the 15-day extension of the fishing season in the Prince William Sound and Copper River areas and partly to the exploitation of new bars, as well as an increase in the number of clam diggers. While the bulk of the product consisted of razor clams from central Alaska—where two plants were engaged exclusively in canning clams and two packed both salmon and clams—a fair quantity of butter clams was handled in the southeastern district at the plant of the Alaskan Glacier Sea Food Co., which put up an experimental pack of this species in the preceding year.

Observations of the clam beds in the Seward-Katalla district were made during the season under the direction of Seton H. Thompson, and it was stated that the beds were in a generally satisfactory condition, with an abundance of young clams. It was also pointed out that of the clams taken in the commercial fishery in 1931, 80 per cent were mature. In the Kodiak area the beaches from Swikshak Lagoon to Cape Douglas did not yield as many razor clams as usual, due to the difficulty of obtaining them rather than to a decrease in the abundance. This locality produced about half of the pack of the Kodiak area, the remainder being secured in Kashvik Bay on the mainland and in Halibut Bay on Kodiak Island, about 25 miles south of Cape Karluk.

Employment was given to 340 persons, of whom 322 were whites, 5 natives, 7 Japanese, and 6 Filipinos. The output consisted of 42,292 cases, containing 1,107,762 pounds, and 100 dozen clams in the shell, with a total value of $312,457—an increase of approximately 30 per cent in quantity and 29 per cent in value over the production in 1930, when 852,924 pounds, valued at $241,890, were prepared.

Property losses were reported in the amount of $300, consisting of the loss of a skiff and damage to a cannery building.

Products of Alaska clam industry in 1931

Item	Cases	Pounds	Value
Minced:			
½-pound cans (48 to case)	30,031	720,744	$215,105
10-ounce cans (48 to case)	10,597	317,910	86,541
1-pound cans (48 to case)	100	4,800	1,000
Whole:			
1-pound cans (48 to case)	966	46,368	6,949
5-pound cans (6 to case)	585	17,550	2,779
Juice: 5-pound cans (6 to case)	13	390	33
Total	42,292	1,107,762	312,407
Fresh, in shell: 100 dozen		240	50
Grand total		1,108,002	312,457

SHRIMP

Two plants in southeastern Alaska—that of the Alaskan Glacier Sea Food Co. at Petersburg and the Reliance Shrimp Co.'s plant at Wrangell—again engaged in the shrimp industry, while in central Alaska a small quantity of shrimp was handled as an experiment by the Northern Seafood Co. at Cordova. Although operations were on about the same scale as in the preceding year, with a slightly larger number of persons employed, there was a considerable decline in the amount of the product, which was the smallest since 1922.

The number of persons engaged in the shrimp industry was 117, of whom 15 were whites, 65 natives, 21 Japanese, 10 Filipinos, 5 Mexicans, and 1 Chinese. Products consisted of 457,405 pounds of shrimp meat, valued at $184,050, and 2,645 pounds of fresh shrimp in the shell, valued at $397, a total of 460,050 pounds, valued at $184,447. Comparable figures for 1930 show a production of 513,826 pounds, valued at $210,503.

CRABS

The Northern Seafood Co. at Petersburg was again the chief producer of crab meat in southeastern Alaska, while a small quantity of the product was prepared by a plant at Wrangell in connection with other shellfish operations. Three operators were engaged in the industry in central Alaska—the Alaska Sea Products (Inc.), Northern Seafood Co., and Ed Pfister, all of Cordova. Employment was given to 67 whites, 7 Filipinos, and 1 Mexican. Products consisted of 99,957 pounds of cold-packed meat, valued at $39,078, 522 dozen crabs in the shell, valued at $884, and 263 cases canned (forty-eight ½-pound cans to the case), valued at $2,104. The total value of products in 1931 was $42,066, as compared with $35,397 in 1930—an increase of approximately 19 per cent.

JAPANESE VESSELS IN BERING SEA

Crab-canning operations were again carried on in Bering Sea by Japanese fishing interests, whose activities were largely of an experimental nature. No report has been received by the bureau as to the amount of the product secured by them in these waters in 1931. The floating crab cannery *Nagato Maru* spent some three months in the district, where its launches were observed operating about 5 miles northwest of Unimak Island, in the vicinity of Amak Island, and farther to the eastward in the same general locality as the *Taihoku Maru* operated during the previous year. The trawler *Kokusai Maru* also was in the Bering Sea region for a number of weeks, making stops at Attu, Atka, and Unalaska. It is understood that the cruise of the latter vessel was primarily in connection with a proposed good-will visit of Japanese fliers to this country, but that attention also was given to conditions affecting the fisheries.

TROUT

Trout operations in southeastern Alaska in 1931 were incidental to other branches of the fishery industry, while in the central district a small output was reported by independent operators who gave employment to four white fishermen. The products were as follows: Dolly Vardens, 49,797 pounds fresh, valued at $4,975; 6,502 pounds frozen, valued at $469; and 400 pounds pickled, valued at $36; steelheads, 6,155 pounds fresh, valued at $458; 21,220 pounds frozen, valued at $688; and 72 cases, or 3,456 pounds, canned, valued at $576. The total production of both species was 87,530 pounds, valued at $7,202, as compared with 98,246 pounds valued at $12,084 in 1930—a decrease of about 11 per cent in quantity and 40 per cent in value.

MISCELLANEOUS FISHERY PRODUCTS

Several species of fish of minor commercial importance are taken in small quantities, chiefly in connection with the halibut fishery, and are landed at ports of Alaska and British Columbia and at Seattle. Such products landed in Alaska in 1931 were as follows: Sablefish, 1,110 pounds fresh, valued at $30, and 278,235 pounds frozen, valued at $13,256; rockfishes, 4,451 pounds fresh, valued at $134, and 18,468 pounds frozen, valued at $543; flounders, 210,000 pounds fresh, valued at $5,250, and 65,172 pounds frozen, valued at $1,637; "lingcod," 526 pounds frozen, valued at $16; and smelt, 1,340 pounds fresh, valued at $80. Most of the flounders were used in Alaska for mink feed. The smelt production shown herein was reported from central Alaska, and the remaining products from southeastern Alaska.

FUR-SEAL INDUSTRY

PRIBILOF ISLANDS

GENERAL ADMINISTRATIVE WORK

The steady growth of the Pribilof Islands fur-seal herd under Government management has brought about a gradual expansion of the bureau's work at the islands, the general plan of which is being continued along established lines. In 1931 there were taken 49,524 fur-seal skins, an increase of 7,024 over the take in the previous year. Foxing operations on St. Paul and St. George Islands were carried on as usual, and in the 1931–32 season 1,426 pelts were obtained, the largest take recorded in over 40 years.

Progress was made in the construction of additional buildings and the extension of improved roads to facilitate the taking of sealskins and their preparation for shipment. Equipment for the new by-products plant was installed, but it was not ready for operation during the sealing season, and it is probable that the depressed market on oils may prevent any profitable utilization of the fur-seal carcasses for some time to come. Meanwhile, investigations are being made to determine the practicability of using fur-seal oil as fuel for Diesel engines.

The Navy Department again detailed a vessel, the U. S. S. *Vega*, to transport the general supplies for the Pribilof Islands and to bring out the shipment of sealskins on the return trip to Seattle. Assistance was rendered also by the U. S. Coast Guard, which maintained an effective patrol for the protection of the fur seals, both in the vicinity of the islands and while the animals were on their northward migration. The cooperation of these branches of the Government is of very material assistance to the bureau in the administration of the fur-seal activities.

The Canadian and Japanese Governments continued having their shares of Pribilof Islands sealskins sold by the United States, receiving payment in money rather than the actual delivery of skins. The United States share of fur-seal skins taken by the Japanese Government in 1931 was received at St. Louis in February, 1932.

Commissioner O'Malley visited the Pribilof Islands in July to observe sealing operations. Among those who accompanied him on this trip was P. B. Fouke, president of the Fouke Fur Co., contractors for finishing and selling the Government fur-seal and fox skins taken at the islands.

TRANSPORTATION OF SUPPLIES

The U. S. S. *Vega* transported the general supplies required for the Pribilof Islands. The vessel left Seattle on July 24 and arrived at the islands on August 2. Cargo consisted of approximately 997 tons of general supplies, 1,322 tons of coal, 255,000 board feet of lumber, and 52,000 shingles. The *Vega* left the islands on August 17 with 49,425 fur-seal skins, some miscellaneous freight, and six passengers, arriving at Seattle August 24.

During the year a number of minor shipments of supplies were forwarded to the Pribilof Islands from Seattle on the *Penguin* on the following dates: April 7, June 1, September 2, and October 12. The September shipment included 31 tons of freight which was taken aboard at Seward on July 28 and which consisted of equipment transferred to the bureau from the Alaska Railroad.

POWER VESSEL "PENGUIN"

At the beginning of the year the *Penguin* was stationed at its headquarters at Unalaska, whence a trip was made to the Pribilofs on January 7 with passengers, mail, and cargo. The weather was exceptionally fine throughout the trip, greatly expediting the discharge of freight at both islands. On the return trip on January 10 three bureau employees were passengers to Unalaska, proceeding thence on a mail boat to Seattle. The *Penguin* sailed again for the Pribilofs on February 21 with mail and general cargo and returned to Unalaska on February 24.

On the following day the *Penguin* departed for Seattle via Seward, having as passengers a school teacher from St. Paul Island to Seattle and an employee of the Department of Justice and his wife from Unalaska to Seward. Stormy weather en route necessitated taking shelter at Port Graham, Cook Inlet, until conditions improved. The two passengers for Seward were discharged there on March 2, and on March 11 the vessel reached Seattle.

The *Penguin* sailed on April 7 for the Pribilofs via Ketchikan, Petersburg, Perryville, Squaw Harbor, and Unalaska with a capacity load of freight and 16 passengers, of whom 15 were bureau employees and 1 was an employee of the Department of Justice stationed at Unalaska. Seven natives were transferred from Perryville to St. Paul Island. After landing the passengers and cargo and performing some interisland work the vessel proceeded to Unalaska, arriving there on April 25. On April 28, 43 natives were transported to St. Paul Island from Makushin, Akutan, and Unalaska. One bureau employee and four persons from the naval radio station at St. Paul Island took passage on the *Penguin* on May 1 for Seattle; and six passengers were taken aboard at Unalaska on May 3, of whom two went as far as Seward and the others to Seattle, which was reached on May 13. The vessel carried also miscellaneous freight and the season's take of fox skins, consisting of 889 blue and 26 white pelts consigned to St. Louis.

Carrying three members of the bureau's staff, 22 Fouke Fur Co. employees to assist with sealing operations, and a cargo of general supplies, the *Penguin* sailed for the Pribilofs on June 1, reaching the islands on June 11. After attending to interisland transportation the vessel sailed for Seattle on the following day and arrived there on June 20.

From June 28 to August 20 the *Penguin* was used by the Commissioner of Fisheries on a trip of general inspection of the fishery and fur-seal activities. Stops were made at various points in southeastern, central, and western Alaska, and the vessel was at the Pribilof Islands from July 16 to 18, inclusive. While the *Penguin* was on this detail, the fisheries patrol vessel *Crane* served as tender for the islands.

Another round trip between Seattle and the Pribilofs was made by the *Penguin* from September 2 to September 25. Interisland duties were performed during this trip, including the transportation of 18 natives from St. Paul Island to St. George Island. Six natives were transferred from St. Paul Island to Unalaska, and three bureau employees and one native were taken to Seattle.

The *Penguin* left Seattle for the Pribilofs on October 12, carrying a full cargo and two natives. St. George Island was reached on October 28 after a very stormy passage which necessitated a number of stops en route. At Unalaska 9 passengers were taken aboard for transfer to St. Paul Island. Of these, 3 were connected with the naval radio station at the island and 6 were natives. The vessel left for Seattle on October 30 and stopped en route at a number of villages along the Alaska Peninsula to return native workmen to their homes. Seventeen employees of the bureau at the islands were returned to Seattle, and Warden Charles Petry and 2 others were picked up at Seward for transportation to the States. The vessel reached its destination on November 15 and was moored in Lake Union for the remainder of the year for minor repairs and general overhauling. During the year the *Penguin* cruised 28,550 nautical miles.

ROADS

St. Paul Island.—In 1931, road construction on St. Paul Island was confined chiefly to the Big Lake and Northeast Point roads. On June 4 work was commenced in surfacing the Northeast Point road with scoria from a scoria deposit in Polovina Hill. A total of 1¼ miles of this road was surfaced during the season. It is believed that it will be possible to reach Northeast Point by truck during the sealing season of 1932. The scoria-surfaced road now extends 7 miles from the village.

The work on the Big Lake project comprised the grading of the sand dunes for a roadbed along the shores of the lake, and the laying of road lumber that had been distributed at strategic points in the previous season. A plank road 1⅜ miles long was constructed.

St. George Island.—In September and October considerable progress was made in the extension of the road from St. George village to North and Staraya Artil rookeries. It is the purpose ultimately to make Zapadni rookery a terminus of this road. Planks were used for surfacing, as in the previous year. A total of 5,660 feet of road has been constructed from the village toward North rookery, and of this distance 3,900 feet is surfaced with road planks.

The scoria found on St. George Island is considered too fine for road work, as it has a tendency to wash away unless mixed with gravel or rock. Therefore, for the section of the road connecting Staraya Artil rookery with Zapadni rookery the shale rock that is present in the immediate vicinity will be used for road surfacing.

BUILDINGS

St. Paul Island.—The building that houses the new electrical plant was completed during the winter and machinery was installed. Considerable additional equipment is still necessary to make full use of the plant for the village lighting system.

An overhead carrying system was an improvement in the newly completed extension to the sealskin washhouse. The carriers facilitate the handling of skins during blubbering operations. The overhead system is also equipped with carriers for blubber removed from the skins. Well-lighted and draftless working rooms are provided for seal blubberers in the building. An electrically operated wringer to extract surplus water from blubbered skins was added to the equipment in the blubbering shop.

A new pipe line was laid from the washhouse to a point offshore where water is available at all stages of the tide, and a small building was erected to house the pumping equipment. With this system there can be obtained about four times as much water as formerly in the same period of time.

The new hospital building which was started last season was completed during the winter. A new garage was erected early in the fall for trucks, tractors, and other motive equipment at the island.

In addition to the completion of the above-mentioned buildings, a great amount of work was done on the foundations of future structures. Footings were laid for an extension to the salt house to be used for barreling skins, and also for a new washhouse; and excavation was made for the foundation of a bunk house to accommodate sealing assistants from the States. Work was begun on the new Government house and community house, as well as on raising the floor of the old company house preparatory to laying new cement foundation.

Considerable time was spent on construction work and on the installation of machinery at the by-products plant at the beginning of the season, and for that reason little could be done toward completion of the wharf at East Landing which was begun in 1930.

St. George Island.—The new company house which was started in 1930 for the accommodation of unmarried employees and transients was completed during the winter. The erection of a new coal house and a chicken house was undertaken in the fall after the close of the sealing season.

Other construction work included the repairing and widening of the dock so that additional cargo space is now available for receiving and shipping freight.

NATIVES

CENSUS

The annual census, taken as of December 31, 1931, showed 232 native residents on St. Paul Island. In addition, 1 St. Paul Island native was in a Seattle hospital, and 7 were elsewhere, making a total of 240 accredited to the island. One native, formerly enrolled at the Salem Indian School, Chemawa, Oreg., is married and living in Seattle, and one who was reported as temporarily absent at the close of the year 1930 has become a permanent resident elsewhere. These two, therefore, have been dropped from the census list. One native from St. George Island was recorded as having become a permanent resident of St. Paul Island. During the year there were 13 births and 5 deaths among the natives.

On St. George Island there were 144 native residents as of December 31, 1931. One native left the island and became a permanent resident of St. Paul Island. There were five births and two deaths during the year.

The total number accredited to both islands on December 31, 1931, was 384, a net increase of nine over the figures for the previous year.

MEDICAL SERVICES

Two physicians were stationed at the Pribilof Islands during the year to render medical aid to the native population and to Government employees and their families. A dentist for the islands arrived at St.

Paul Island on the *Penguin* on April 18 and was on duty throughout the remainder of the year. It is planned to have him continue until all needed dental work is completed.

Two natives, a woman and child, from St. Paul Island were taken to Seattle on the *Vega* in August for medical attention. The woman's case was properly cared for, and she returned to St. Paul Island on the *Penguin* in October. The child, a girl 5 years old, was placed in the Orthopedic Hospital at Seattle for treatment for tubercular hip. She is reported to be getting along satisfactorily, but it will probably be necessary for her to remain at the hospital for at least a year.

SCHOOLS

The bureau maintains schools for the native children on St. Paul and St. George Islands, two teachers being employed on each island.

St. Paul Island.—The 1930–31 school year began September 2, 1930, and closed April 30, 1931. There were 16 boys and 17 girls enrolled in the junior and 14 boys and 19 girls in the senior school, a total of 66 pupils.

St. George Island.—The school opened on September 2, 1930, and closed May 29, 1931. In the junior school 18 pupils were enrolled and in the senior school 20, a total of 38 pupils.

SAVINGS ACCOUNTS

As in previous years, the Commissioner of Fisheries had in his custody certain funds of a number of the Pribilof Island natives. He also held funds belonging to the native church on St. Paul Island. These funds were kept on deposit in the Washington Loan & Trust Co., Washington, D. C. The rate of interest was reduced twice during the year—on April 1 from 3 to 2½ per cent and on July 1 to 2 per cent. Interest was calculated on monthly balances and credited semiannually. One account was closed during the year. A summary of the accounts as a whole for the year 1931 is shown in the statement that follows:

On hand, Jan. 1, 1931	$8, 627. 90
Interest earned from Jan. 1 to Dec. 31, 1931	201. 76
	8, 829. 66
Withdrawn by natives	263. 01
On hand, Dec. 31, 1931	8, 566. 65

An itemized statement of the funds, showing the individual accounts follows:

Funds of the Pribilof Islands natives and the St. Paul Island native church in the custody of the United States Commissioner of Fisheries, as trustee, December 31, 1931

Fratis, Iuliania [1]	$127. 98
Gromoff, Iuliania	350. 95
Kochutin, Alexandra	3, 796. 20
Kozloff, Marina (Shane)	117. 91
Kozloff, Raisa	110. 63
Krukoff, Martha (Bourdukofsky)	82. 96
Lekanof, Sophia M	81. 84
Lestenkof, Michael	372. 95
Merculief, Alexandra	176. 21
Merculief, Daniel	522. 70
Merculief, Erena	$666. 48
Merculief, George	145. 33
Merculief, jr., George	63. 18
Merculief, Tatiana	666. 48
Pankoff, Agrippina	180. 74
St. Paul Island native church	972. 14
Sedick, Lavrenty	131. 97
Total	8, 566. 65

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[1] Not living on Pribilof Islands in 1931.

PAYMENTS FOR TAKING FUR-SEAL SKINS

For their work in connection with the taking, curing, and shipping of fur-seal skins the resident natives of the Pribilof Islands are paid cash at a flat rate of 75 cents for each sealskin taken. The payments are distributed among the men and boys taking part in the work in accordance with the rated ability and skill of each. The persons entitled to this compensation are divided into classes, the individuals in each class receiving equal amounts. In addition, small bonuses in cash are allowed for special work in connection with the sealing operations. Payments were made as shown below.

St. Paul Island.—For the 39,964 skins taken on St. Paul Island the sum of $29,973 was paid and in addition a total of $100 was allowed two foremen for special services, $50 for a cook, and $140 for seven mess attendants. A statement of the earnings follows:

Payments to St. Paul Island natives for taking fur-seal skins, calendar year 1931

Classification	Number of men	Share of each	Total	Classification	Number of men	Share of each	Total
First class	34	$606.75	$20,629.50	Foreman (additional compensation)			$40.00
Second class	10	506.25	5,062.50	Cook			50.00
Third class	6	384.00	2,304.00	Mess attendants, 7, @ $20 each			140.00
Fourth class	5	325.50	1,627.50	Total			30,263.00
Fifth class	6	53.25	319.50				
Boys' class	1	30.00	30.00				
Foreman (additional compensation)			60.00				

St. George Island.—For the 9,560 sealskins taken on St. George Island the sum of $7,170 was paid and in addition a total of $100 was allowed two foremen for special services. A statement of the earnings follows:

Payments to St. George Island natives for taking fur-seal skins, calendar year 1931

Classification	Number of men	Share of each	Total	Classification	Number of men	Share of each	Total
First class	23	$219.00	$5,037.00	Foreman (additional compensation)			$55.00
Second class	7	174.00	1,218.00	Do			45.00
Third class	5	135.00	675.00	Total			7,270.00
Fourth class	2	93.75	187.50				
Fifth class	2	21.00	42.00				
Boys' class	1	10.50	10.50				

PAYMENTS FOR TAKING FOX SKINS

The natives are paid $5 in cash for each fox skin taken on the Pribilof Islands. For the season of 1930–31 these payments amounted to $1,175 for the 235 skins taken on St. Paul Island and $3,400 for the 680 taken on St. George Island, a total of $4,575.

FUR SEALS

QUOTAS FOR KILLING AND RESERVING

Plans for sealing operations in 1931, as approved by the Department of Commerce, provided for the marking of a breeding reserve of about five thousand 3-year-old male fur seals, divided between St. Paul Island and St. George Island in approximately the ratio of 4 to 1, and the killing of as many of the remaining males of this age as could be secured in the regular sealing periods. Provision was made for increasing the reserve if counts of the idle and harem bulls in the breeding season indicated the advisability of such action. As some of the 3-year-old males are never taken up in the drives the number of animals remaining for the reserve is always greater than the number marked.

KILLINGS

In 1931, 49,524 fur seals were killed, of which 39,964 were taken on St. Paul Island and 9,560 on St. George Island. Details in regard to the killings are shown in the following tabulations:

Seal killings on Pribilof Islands in 1931

ST. PAUL ISLAND

Date	Serial No. of drive	Hauling ground	Skins secured
June 8	1	Sea Lion Rock (Sivutch)	88
11	2	Reef and Gorbatch	113
16	3	Tolstoi	119
17	4	Zapadni	68
19	5	Reef and Gorbatch	296
20	6	Polovina and Little Polovina	127
21	7	Vostochni and Morjovi	688
22	8	Tolstoi, Lukanin, and Kitovi	165
23	9	Zapadni and Little Zapadni	433
24	10	Reef and Gorbatch	1,456
25	11	Polovina and Little Polovina	124
26	12	Vostochni and Morjovi	1,041
27	13	Tolstoi, Lukanin, and Kitovi	451
28	14	Zapadni and Little Zapadni	807
29	15	Reef and Gorbatch	2,040
30	16	Polovina and Little Polovina	207
July 1	17	Vostochni and Morjovi	1,090
2	18	Tolstoi, Lukanin, and Kitovi	525
3	19	Zapadni and Little Zapadni	996
5	20	Reef and Gorbatch	2,167
6	21	Polovina and Little Polovina	645
7	22	Vostochni and Morjovi	1,552
8	23	Tolstoi, Lukanin, and Kitovi	921
9	24	Zapadni and Little Zapadni	1,993
10	25	Reef and Gorbatch	2,407
11	26	Polovina and Little Polovina	670
12	27	Vostochni and Morjovi	1,942
13	28	Tolstoi, Lukanin, and Kitovi	1,020
14	29	Zapadni and Little Zapadni	1,538
15	30	Reef and Gorbatch	3,178
16	31	Polovina and Little Polovina	236
17	32	Tolstoi, Lukanin, and Kitovi	752
18	33	Vostochni and Morjovi	2,292
19	34	Zapadni and Little Zapadni	940
20	35	Reef and Gorbatch	1,907
21	36	Polovina and Little Polovina	708
22	37	Vostochni and Morjovi	1,170
23	38	Tolstoi, Lukanin, and Kitovi	599
24	39	Zapadni and Little Zapadni	637
25	40	Reef and Gorbatch	1,429
26	41	Polovina and Little Polovina	420
29-30	------	Skins from seals that died as a result of reserving operations	7
		Total	39,964

Seal killings on Pribilof Islands in 1931—Continued

ST. GEORGE ISLAND

Date	Serial No. of drive	Hauling ground	Skins secured
June 8	1	North and East	20
13	2	East	51
15	3	North and Staraya Artil	54
19	4	North	69
21	5	East	59
23	6	North and Staraya Artil	148
24	7	Zapadni	61
25	8	East	90
27	9	North and Staraya Artil	240
28	10	Zapadni	226
29	11	East	304
July 1	12	North and Staraya Artil	431
2	13	Zapadni	231
3	14	East	308
5	15	North and Staraya Artil	539
6	16	Zapadni	110
7	17	East	337
9	18	North and Staraya Artil	422
10	19	Zapadni	285
11	20	East	813
13	21	North and Staraya Artil	861
14	22	Zapadni	114
15	23	East	766
17	24	North and Staraya Artil	948
18	25	Zapadni	130
19	26	East	365
21	27	North and Staraya Artil	417
22	28	Zapadni	75
23	29	East	624
25	30	North and Staraya Artil	461
28	------	Skin from seal that died as a result of reserving operations	1
		Total	9, 560

AGE CLASSES

The age class of a male seal belonging to the Pribilof Islands herd is determined from the length of its body. The classification was derived from the measurements of a large number of pups branded in 1912 and killed in subsequent years. The limits of the various age classes are shown in the table following:

Age classes of male seals, Pribilof Islands

Age	Length of summer seals (inches)	Length of fall seals (inches)	Age	Length of summer seals (inches)	Length of fall seals (inches)
Yearlings	Up to 36. 75	Up to 38. 75	4-year-olds	46 to 51. 75	48 to 53. 75
2-year-olds	37 to 40. 75	39 to 42. 75	5-year-olds	52 to 57. 75	54 to 59. 75
3-year-olds	41 to 45. 75	43 to 47. 75	6-year olds	58 to 63. 75	60 to 65. 75

Ages of seals killed on Pribilof Islands, calendar year 1931

[On basis of classification shown in preceding table]

Age	St. Paul Island	St. George Island	Total	Age	St. Paul Island	St. George Island	Total
Yearling males	12	--------	12	5-year-old males	1	1	2
2-year-old males	1, 064	199	1, 263	Cows [1]	44	18	62
3-year-old males	38, 559	9, 208	47, 767				
4-year-old males	284	134	418	Total	39, 964	9, 560	49, 524

[1] Cows unavoidably and accidentally killed or found dead.

It should be stated that some of the seals recorded in the above tabulation as 2-year-olds or 4-year-olds probably were 3-year-olds. Not all the male seals of a given age fall within the length limits assigned for the males of that age. As far as possible, the killings in 1931 were confined to 3-year-old males.

RESERVING OPERATIONS

The annual provision for future breeding stock was made in 1931 by reserving from killing an adequate number of 3-year-old male fur seals. On St. Paul Island 3,570 animals and on St. George Island 1,656 were marked by shearing a patch of fur from the head. Details in regard to the marking operations are as follows:

Marking of 3-year-old male fur seals for breeding reserve, Pribilof Islands, 1931

ST. PAUL ISLAND

Date	Hauling ground driven	Number seals marked	Date	Hauling ground driven	Num- seals marked
July 27	Vostochni and Morjovi	775	July 31	Zapadni and Little Zapadni	578
28	Tolstoi, Lukanin, and Kitovi	581		Total	3,570
29	Gorbatch	956			
30	Reef	680			

ST. GEORGE ISLAND

Date	Hauling ground driven	Number seals marked	Date	Hauling ground driven	Num- seals marked
July 26	Zapadni	196	July 30	North	647
27	East	597		Total	1,656
28	Staraya Artil	216			

COMPUTATION OF FUR-SEAL HERD

The computation of the size of the fur-seal herd in 1931 was again made by Supt. H. J. Christoffers, who was assisted by R. B. Payne, A. Christoffersen, and Lee C. McMillin. As of August 10 the total of all classes was 1,127,082—a numerical increase of 81,981 and a percentage increase of 7.84 over the figures for the preceding year. The detailed report will be found on pages 89 to 96 of this document. Following is a comparative statement of the numerical strength of the various elements of the fur-seal herd in the years 1920 to 1931, inclusive:

General comparison of computations of the seal herd on the Pribilof Islands, 1920 to 1931

Classes	1920	1921	1922	1923	1924	1925
Harem bulls	4,066	3,909	3,562	3,412	3,516	3,526
Breeding cows	167,527	176,655	185,914	197,659	208,396	226,090
Surplus bulls	6,115	3,301	2,346	1,891	2,043	3,558
Idle bulls	1,161	747	508	312	390	311
6-year-old males	4,153	3,991	3,771	4,863	8,489	4,105
5-year-old males	5,007	4,729	6,080	10,612	5,132	16,792
4-year-old males	5,667	6,780	11,807	5,710	18,670	18,692
3-year-old males	10,749	14,668	7,459	22,786	21,551	21,185
2-year-old males	39,111	41,893	40,920	43,112	45,685	43,515
Yearling males	51,074	50,249	52,988	55,769	59,291	52,091
2-year-old cows	39,480	43,419	46,280	48,801	51,359	49,786
Yearling cows	51,081	54,447	57,413	60,422	64,240	57,309
Pups	167,527	176,655	185,914	197,659	208,396	226,090
Total	552,718	581,443	604,962	653,008	697,158	723,050

General comparison of computations of the seal herd on the Pribilof Islands, 1920 to 1931—Continued

Classes	1926	1927	1928	1929	1930	1931
Harem bulls	4, 034	4, 643	6, 050	7, 187	8, 312	9, 233
Breeding cows	244, 114	263, 566	284, 725	307, 491	332, 084	358, 642
Surplus bulls	2, 002	4, 827	5, 285	5, 207	3, 963	3, 291
Idle bulls	423	972	1, 449	1, 633	1, 899	1, 888
6-year-old males	13, 434	13, 450	12, 857	10, 399	5, 612	6, 553
5-year-old males	16, 812	16, 073	13, 001	7, 016	8, 191	10, 193
4-year-old males	17, 872	14, 448	7, 798	9, 102	11, 327	12, 966
3-year-old males	17, 189	9, 730	11, 133	13, 639	14, 871	13, 198
2-year-old males	38, 183	41, 252	49, 087	64, 354	69, 674	74, 828
Yearling males	56, 514	61, 026	65, 861	85, 381	92, 232	99, 612
2-year-old cows	44, 415	48, 186	57, 061	67, 210	72, 605	78, 410
Yearling cows	62, 175	67, 131	72, 481	85, 417	92, 247	99, 626
Pups	244, 114	263, 566	284, 725	307, 491	332, 084	358, 642
Total	761, 281	808, 870	871, 513	971, 527	1, 045, 101	1, 127, 082

FOXES

The care of blue-fox herds on St. Paul and St. George Islands is incidental to the fur-seal work, requiring attention at a time when sealing activities are at a minimum. Throughout the summer the foxes find an abundance of natural food, consisting of seal carcasses, birds' eggs, and marine life along the beaches. In the winter, when the natural food supply is inadequate, the animals are fed preserved seal meat and specially prepared rations. Captures are made in the months from December to February, inclusive, to obtain pelts and to mark an appropriate number of animals for future breeding stock.

TRAPPING SEASON OF 1931–32

During the season of 1931–32 there were taken 1,426 fox pelts, of which 1,401 were blue and 25 white. Two hundred and eighty-nine blue and 25 white pelts were taken on St. Paul Island, and 1,112 blue pelts on St. George Island. There were also trapped, marked, and released for breeding purposes 37 foxes on St. Paul Island and 432 on St. George Island. The breeding reserve includes, in addition, a considerable number of animals that were not captured during the season.

REINDEER

St. Paul Island.—During the year ended September 30, 1931, 19 reindeer were killed and used for food. A count of the animals in the herd on September 29 showed a total of 453, of which 80 were the young of the season. The herd was apparently in excellent condition.

St. George Island.—Five reindeer were killed and used for food during the year ended September 30, 1931. A count made on September 22 showed 47 animals in the herd, of which 5 were the young of the season.

FUR-SEAL SKINS

SHIPMENTS

Shipment of fur-seal skins taken on the Pribilof Islands in the calendar year 1931 was made on the U. S. S. *Vega*, which arrived at Seattle, Wash., on August 24. This shipment consisted of 39,871 skins taken on St. Paul Island and 9,554 taken on St. George Island, a total of 49,425. In all probability there were actually shipped from St. George Island 9,560 skins, the total number taken there in 1931, as it is believed that a miscount was made in packing the skins and that the error will be rectified when they are unpacked. The shipment was forwarded from Seattle by freight on August 25 and was delivered to the department's selling agents at St. Louis, Mo., on September 2.

One barrel containing 93 skins, inadvertently omitted from the shipment at St. Paul Island, was forwarded later on the *Penguin*, reaching Seattle on September 26, whence it was forwarded to St. Louis by express.

SALES

In 1931 a total of 45,711 fur-seal skins taken on the Pribilof Islands were sold at three public auction sales held at St. Louis. There were also sold through special sales 271 fur-seal skins taken at those islands. With the following statements of these sales the sales of other fur-seal skins by the Department of Commerce for the account of the Government are included in order that the records may be complete.

Public auction sale, March 30, 1931.—At the spring sale 21,071 fur-seal skins taken at the Pribilof Islands, dressed, dyed, and machined, sold for $453,699.75. Of these skins, 11,503 were dyed black and 9,568 logwood brown (Bois de Campêche). There were also sold 137 dressed, dyed, and machined Japanese fur-seal skins for $3,155.50; 33 raw-salted Japanese skins for $16.50; and 2 raw-salted confiscated skins for $1, making a grand total of $456,872.75 for fur-seal skins at this sale.

The Japanese fur-seal skins were the United States Government's share of such skins taken by the Japanese Government in 1929, delivered pursuant to the provisions of the North Pacific Sealing Convention of July 7, 1911.

Public auction sale, August 24, 1931.—At the August sale 15,125 fur-seal skins taken at the Pribilof Islands, dressed, dyed, and machined, sold for $282,642.75. Of these skins, 9,125 were dyed black and 6,000 logwood brown.

Public auction sale, October 19, 1931.—At the October sale 9,515 fur-seal skins taken at the Pribilof Islands, dressed, dyed, and machined, sold for $153,938.50. Of these skins 5,535 were dyed black and 3,980 logwood brown. There were also sold 32 confiscated skins, raw, for $15.25, making a total of $153,953.75 for fur-seal skins at this sale.

Special sales.—In the calender year 1931, 271 fur-seal skins taken at the Pribilof Islands were sold at special sales for $6,915.16. Of these skins, 200 were dressed, dyed, and machined, 75 being of the black dye and 125 logwood brown; 61 were raw salted; and 10 were specially prepared for exhibition purposes showing (1) a section of the pelt in the natural hair, (2) a section unhaired with the fur in natural color, (3) a section with the fur dyed black, and (4) a section with the fur dyed logwood brown. The dyed skins included 150 that were sent to Paris and made up into coats, which were returned to this country and used for advertising.

The following tables give further details in regard to the sales of fur-seal skins by the Department of Commerce for the account of the Government in 1931:

Comparative values, by sizes and grades, with percentages each size, of Pribilof sealskins sold at public auction in 1931

Classes and sales	Grade	Number	High	Low	Average	Total	Total number	Average price	Total price	Per-centage
DYED BLACK										
Extra extra large:										
Mar. 30	I and II	14	$45.50	$45.50	$45.50	$637.00	42	$32.39	$1,360.50	0.37
	Scarred, faulty, etc	28	26.00	24.50	25.84	723.50				
Extra large:										
Mar. 30	I and II	283	45.50	35.00	44.60	12,623.00	742	32.10	23,818.50	6.45
	Scarred, faulty, etc	453	26.00	23.50	24.60	11,146.00				
	III	6	8.25	8.25	8.25	49.50				
Aug. 24	I and II	120	34.50	34.00	34.25	4,110.00	247	28.99	7,160.50	2.71
	Scarred, faulty, etc	120	25.00	24.50	24.75	2,970.00				
	III	7	11.50	11.50	11.50	80.50				
Oct. 19	I and II	55	25.50	22.00	25.18	1,385.00	122	20.35	2,482.25	2.21
	Scarred, faulty, etc	60	17.50	17.50	17.50	1,050.00				
	III	7	6.75	6.75	6.75	47.25				
Large:										
Mar. 30	I and II	1,868	37.50	31.00	33.04	61,722.50	4,123	28.13	115,970.50	35.84
	Scarred, faulty, etc	2,223	26.50	21.50	24.28	53,984.00				
	III	32	8.25	8.25	8.25	264.00				
Aug. 24	I and II	1,380	27.50	20.00	24.30	33,532.50	2,958	20.73	61,309.50	32.41
	Scarred, faulty, etc	1,520	19.00	17.00	17.84	27,110.00				
	III	58	11.50	11.50	11.50	667.00				
Oct. 19	I and II	660	22.00	18.50	20.36	13,435.00	1,613	18.22	29,396.50	29.14
	Scarred, faulty, etc	910	18.75	15.50	17.22	15,671.25				
	III	43	6.75	6.75	6.75	290.25				
Medium:										
Mar. 30	I and II	2,330	26.50	23.00	25.18	58,680.00	6,186	21.36	132,122.25	53.78
	Scarred, faulty, etc	3,707	21.75	17.00	19.54	72,425.50				
	III	149	7.75	5.75	6.82	1,016.75				
Aug. 24	I and II	2,600	22.00	19.00	20.70	53,820.00	5,380	18.77	101,005.00	58.96
	Scarred, faulty, etc	2,680	18.50	15.75	17.26	46,260.00				
	III	100	9.50	9.00	9.25	925.00				
Oct. 19	I and II	1,375	19.00	17.75	18.23	25,065.00	3,445	16.63	57,307.50	62.24
	Scarred, faulty, etc	1,960	16.75	15.00	16.09	31,530.00				
	III	110	6.75	6.25	6.48	712.50				
Small medium:										
Mar. 30	I and II	120	18.25	18.00	18.17	2,180.00	410	14.51	5,948.75	3.56
	Scarred, faulty, etc	263	14.50	13.00	13.74	3,613.50				
	III	27	5.75	5.75	5.75	155.25				
Aug. 24	I and II	270	18.25	18.00	18.08	4,882.50	540	16.54	8,932.50	5.92
	Scarred, faulty, etc	270	15.50	14.50	15.00	4,050.00				
Oct. 19	I and II	175	16.50	16.00	16.11	2,820.00	355	13.96	4,957.50	6.41
	Scarred, faulty, etc	150	13.25	13.00	13.10	1,965.00				
	III	30	5.75	5.75	5.75	172.50				

All classes:										
Mar. 30							11,503	24.27	279,220.50	100.00
Aug. 24							9,125	19.55	178,407.50	100.00
Oct. 19							5,535	17.01	94,143.75	100.00
DYED LOGWOOD BROWN										
Extra extra large:										
Mar. 30	I and II	5	45.00	40.50	43.20	216.00	24	28.50	384.00	0.25
	Scarred, faulty, etc	18	25.50	25.50	25.50	459.00				
	III	1	9.00	9.00	9.00	9.00				
Extra large:										
Mar. 30	I and II	81	45.00	31.50	41.56	3,366.00	256	28.13	7,201.00	2.68
	Scarred, faulty, etc	154	25.50	13.50	23.68	3,646.00				
	III	21	9.00	9.00	9.00	189.00				
Aug. 24	I and II	80	32.50	21.00	28.54	2,283.00	194	23.78	4,614.00	3.23
	Scarred, faulty, etc	110	21.50	20.50	20.95	2,305.00				
	III	4	6.75	6.25	6.50	26.00				
Oct. 19	I and II	1	18.00	18.00	18.00	18.00	1	18.00	18.00	.02
Large:										
Mar. 30	I and II	911	31.50	29.00	30.07	27,396.50	2,102	23.79	50,015.50	21.97
	Scarred, faulty, etc	1,074	25.50	13.50	20.20	21,692.00				
	III	117	9.00	4.50	7.92	927.00				
Aug. 24	I and II	730	25.50	21.00	23.92	17,460.75	1,556	20.65	32,126.50	25.93
	Scarred, faulty, etc	805	18.50	17.00	18.04	14,525.00				
	III	21	6.75	6.25	6.70	140.75				
Oct. 19	I and II	211	21.25	18.00	20.43	4,310.00	694	17.45	12,110.25	17.44
	Scarred, faulty, etc	483	17.00	15.75	16.15	7,800.25				
Medium:										
Mar. 30	I and II	2,690	22.00	14.00	21.05	56,621.50	5,943	17.21	102,251.00	62.11
	Scarred, faulty, etc	3,013	16.25	13.50	14.81	44,631.00				
	III	240	4.75	3.50	4.16	998.50				
Aug. 24	I and II	1,655	18.75	17.75	18.06	29,887.50	3,710	16.37	60,733.25	61.84
	Scarred, faulty, etc	1,920	15.75	14.50	15.55	29,850.00				
	III	135	8.00	6.25	7.38	995.75				
Oct. 19	I and II	1,148	20.00	13.25	17.28	19,838.00	2,530	15.19	38,435.50	63.57
	Scarred, faulty, etc	1,295	15.00	10.50	14.07	18,217.50				
	III	87	5.00	3.75	4.37	380.00				
Small medium:										
Mar. 30	I and II	561	14.75	13.50	14.04	7,878.25	1,243	11.53	14,327.75	12.99
	Scarred, faulty, etc	638	10.50	8.50	9.79	6,243.75				
	III	44	4.75	4.50	4.68	205.75				
Aug. 24	I and II	150	15.25	14.75	14.95	2,242.50	540	12.52	6,761.50	9.00
	Scarred, faulty, etc	322	13.00	12.50	12.76	4,108.00				
	III	68	7.75	5.75	6.04	411.00				
Oct. 19	I and II	404	14.50	13.25	13.80	5,575.50	755	12.23	9,231.00	18.97
	Scarred, faulty, etc	351	10.75	10.00	10.41	3,655.50				
All classes:										
Mar. 30							9,568	18.24	174,479.25	100.00
Aug. 24							6,000	17.37	104,235.25	100.00
Oct. 19							3,980	15.02	59,794.75	100.00

Special sales of Pribilof Islands fur-seal skins in 1931

Date	Number of skins	Description	Price per skin	Total
Jan. 10	5	4-condition exhibition skins	$25.00	$125.00
	5	Raw salted (for display boards)	11.96	59.80
Feb. 27	6	Raw salted (for mounting)	11.96	71.76
Apr. 10	50	Raw salted	9.51	475.50
May 11	35	Dyed logwood brown, large	30.07	1,052.45
	15	Dyed logwood brown, medium	21.05	315.75
Dec. 31	150	75 dyed black and 75 dyed logwood brown; made into coats for advertising purposes		4,689.90
	5	4-condition exhibition skins	25.00	125.00
	271			6,915.16

Sale at St. Louis, Mo., March 30, 1931, of 170 fur-seal skins received from Japanese Government under treaty provisions

Number of skins	Trade classification	Price per skin	Total for lot
	DRESSED, DYED, AND MACHINED, BLACK		
31	6 extra extra large, 5 extra large, 18 large, 2 medium	$29.50	$914.50
48	1 wig, 19 extra extra large, 28 extra large; scarred, faulty, etc	24.00	1,152.00
55	37 large, 16 medium, 2 small medium; scarred, faulty, etc	19.50	1,072.50
3	III; 1 extra extra large, 1 extra large, 1 medium	5.50	16.50
137			3,155.50
33	Raw salted	.50	16.50
170			3,172.00

DISPOSITION OF FUR-SEAL SKINS TAKEN AT PRIBILOF ISLANDS

On January 1, 1931, there were on hand 58,760 fur-seal skins taken at the Pribilof Islands. Of these, 58,738 were at St. Louis, Mo., and 22 at Washington. In 1931, 49,524 Pribilof skins were secured at the islands, 45,982 were disposed of, and 6 were unaccounted for, due probably to a miscount in packing that will be corrected later, leaving 62,296 on hand at December 31, 1931. The following tables show further details in regard to fur-seal skins taken on the Pribilof Islands, as well as details in regard to other Government-owned fur-seal skins under the control of the Department of Commerce.

Summary of all fur-seal skins handled on Pribilof Islands, calendar year 1931

Island	Number taken	Number shipped	Unaccounted for [1]
St. Paul	39,964	39,964	
St. George	9,560	9,554	6
Total	49,524	49,518	6

[1] When skins taken in the commercial season in 1931 were packed for shipment the count was 6 less than the number taken. It is believed that a miscount was made in packing the skins and that the error will be rectified when the skins are unpacked at St. Louis.

Summary of all Government-owned fur-seal skins under control of Department of Commerce, calendar year 1931

Source	On hand Jan. 1			Receipts in 1931	Sales in 1931	Unaccounted for[1]	On hand Dec. 31		
	Fouke Fur Co.	Washington office	Total				Fouke Fur Co.	Washington office	Total
Taken on Pribilof Islands:									
Calendar year 1918, held for reference purposes		7	7					7	7
Calendar year 1923		3	3					3	3
Calendar year 1924		1	1					1	1
Calendar year 1929	16,241	10	16,251		15,720		526	5	531
Calendar year 1930	42,497	1	42,498		30,262		12,234	2	12,236
Calendar year 1931				49,524		6	49,518		49,518
Miscellaneous skins held for reference purposes		4	4					4	4
United States' share of Japanese sealskins:									
Season of 1929	170		170		170				
Season of 1930				172			172		172
Confiscated skins	2		2	63	34		31		31
Total	58,910	26	58,936	49,759	46,186	6	62,481	22	62,503

[1] When skins taken in the commercial season in 1931 were packed for shipment the count was 6 less than the number taken. It is believed that a miscount was made in packing the skins and that the error will be rectified when the skins are unpacked at St. Louis.

Summary of Government-owned fur-seal skins in the custody of Fouke Fur Co., at St. Louis, Mo., calendar year 1931

Source	On hand Jan. 1	Receipts in 1931	Disposed of in 1931	On hand Dec. 31
Taken on Pribilof Islands:				
Calendar year 1929	16,241	[1] 5	[2] 15,720	526
Calendar year 1930	42,497		[3] 30,263	12,234
Calendar year 1931		49,518		49,518
United States' share of Japanese fur-seal skins:				
Season of 1929	170		[2] 170	
Season of 1930		172		172
Confiscated fur-seal skins	2	63	[2] 34	31
Total	58,910	49,758	46,187	62,481

[1] Returned from Washington.
[2] Sold.
[3] 30,262 sold; 1 shipped to Washington for exhibition purposes.

SHIPMENT AND SALE OF FOX SKINS

The 211 blue and 24 white fox skins taken on St. Paul Island in the season of 1930–31 and the 678 blue and 2 white fox skins taken on St. George Island in the same season were shipped from the islands on the *Penguin* in May, arriving at Seattle on May 13, whence they were forwarded by express to the department's selling agents at St. Louis, Mo.

At the public auction sale in St. Louis on March 30, 1931, there were sold 370 blue fox skins that remained from the take on the Pribilof Islands in the 1929–30 season. These skins sold for $14,593.50, an average of $39.44 per skin. The maximum price per skin was $120, obtained for a pelt sold singly.

On October 19, 1931, there were sold at public auction at St. Louis 445 blue and 26 white fox skins taken on the Pribilof Islands in the 1930–31 season. The blue pelts brought $11,015, an average of $24.75 per skin; and the white pelts brought $466, an average of

$17.92 per skin. The maximum price per skin was $86, obtained for a single blue pelt.

SEA-OTTER SKINS

Two sea-otter skins were sold at public auction at St. Louis, Mo., on October 19, 1931, for Government account. These skins were reported to have been taken from animals found dead—one on the beach near Perryville, Alaska, and one at Nakalilok Bay—and had been surrendered to bureau employees in August, 1930, and July, 1931, respectively. When sold one of the skins brought $60 and one $370, a total of $430.

FUR-SEAL PATROL

UNITED STATES COAST GUARD

A patrol for the protection of the fur seals of the North Pacific was again maintained by the U. S. Coast Guard, which assigned six cutters and a 125-foot patrol boat to participate in this work.

Beginning April 5 the *Snohomish* patrolled from the mouth of the Columbia River to Dixon Entrance until the fur-seal herd had passed. The *Tallapoosa* covered the area between Dixon Entrance and Kodiak Island from April 15 to 30 and between Kodiak Island and Unalaska from May 1 to 15, patrolling thereafter in the Bering Sea region. The *Shoshone* and the 125-foot patrol boat sailed from San Francisco about the middle of April for Unalaska, where the former was based until July and the latter until the close of the season. The *Itasca* and *Chelan* also engaged in the fur-seal patrol in Bering Sea during the latter part of the season. On its annual cruise from San Francisco to the Arctic Ocean the *Northland* patrolled waters frequented by the fur seals. The season's patrol extended as far westward as Attu, the westernmost island of the Aleutian chain, and was prosecuted in each locality as long as the circumstances required.

BUREAU OF FISHERIES

From March 26 to the end of May the *Brant* patrolled the waters in the vicinity of Cape Flattery. With the concurrence of the Bureau of Indian Affairs a representative of the Bureau of Fisheries was on duty at La Push to enforce compliance with the regulations prohibiting the use of firearms and motor boats in the taking of fur-seal skins by the Indians. The *Widgeon* was engaged in seal patrol in the vicinity of Sitka in April and May.

SEALING PRIVILEGES ACCORDED ABORIGINES

Under the provisions of the North Pacific Sealing Convention of July 7, 1911, Indians and other aborigines dwelling on the coasts of the waters designated by the convention may take fur-seal skins under limited conditions. In 1931 there were taken and duly authenticated by officials of the respective Governments 1,649 fur-seal skins, of which 186 were taken by Indians under the jurisdiction of the United States and 1,463 by Indians of Canada. The details are as follows:

Washington.—A total of 165 skins taken by the Indians of Washington were authenticated. Of these, 24 were from male seals and 141 from females. The skins were taken by Indians of La Push and Neah Bay in the months from April to June, inclusive, and were authenticated by Raymond H. Bitney, superintendent of the Neah Bay Indian Agency, Neah Bay, Wash.

Alaska.—Twenty-one skins taken by natives of Sitka were authenticated by the master of the bureau's patrol vessel *Widgeon*. Of these skins, 5 were reported to be from male seals, 14 from females, and 2 from unborn pups. The seals from which the skins were secured were taken in waters off Biorka Island in the month of May.

British Columbia.—An official report received by the bureau stated that 1,463 fur-seal skins were taken by Indians off the British Columbia coast during 1931. Of these skins, 55 were from the Queen Charlotte Island area, 21 from the Grenville-Principe area, and 1,387 from the west coast of Vancouver Island.

JAPANESE SEALSKINS DELIVERED TO THE UNITED STATES

Under the terms of the North Pacific Sealing Convention of July 7, 1911, there were allotted to the United States 170 Japanese fur-seal skins, or 10 per cent of the number taken by Japan in territory under its jurisdiction in the year 1931. These skins were received by the department's selling agents at St. Louis, Mo., on February 8, 1932.

INTERNATIONAL COLONIAL EXPOSITION AT PARIS

An appropriate display in respect to the fishery and fur-seal industries of Alaska was included in the American exhibits at the International Colonial Exposition held at Paris from May 1 through October, 1931. Among the articles assembled by the bureau were a life-sized reproduction of a chinook salmon, models of salmon steaks and fillets, canned salmon and clams, a mounted fur seal, several dressed and dyed fur-seal skins, and two fur-seal jackets.

COMPUTATION OF FUR SEALS, PRIBILOF ISLANDS, 1931

By Harry J. Christoffers

During the summer sealing season of 1931 there were killed at the Pribilof Islands 47,767 3-year-old male fur seals, compared with 41,409 3-year-old males killed in 1930. This is an increase of slightly over 15 per cent—considerably more than has been regarded as the average rate of increase for the herd. All of this means that the herd, and consequently the take of skins, is increasing much faster than was previously estimated. It does not mean that so many 3-year-olds were killed that there were not enough left for breeding requirements. The large number in drives on the last days of commercial killings and the large number of 3-year-old males observed on hauling grounds after killing and marking operations ceased on July 31 clearly indicate that the herd is in an extremely satisfactory condition. It is not to be expected that the present rate of increase of killable seals will continue constant from year to year, but the average rate may be kept fairly close to the present if sufficient surplus males are reserved each year for breeding requirements. It is felt that an adequate breeding reserve will be assured if sealing is discontinued about July 25 and careful observations are made throughout the season.

In 1931 all classes of seals, especially the cows, were extremely late in arriving. This condition has existed for the last several years, but was even more pronounced this season. Up to the middle of

July it did not appear that the number to be killed would be greater than in the previous season. At that time, however, all classes of seals arrived in large numbers, immediately changing the outlook. The final results exceeded all expectations.

BULLS

In order to determine whether sufficient males were on hand for breeding requirements, a census of harem and idle bulls was again taken. Reef and Gorbatch rookeries, on St. Paul Island, were counted by Robert B. Payne and the writer. All other rookeries on St. Paul Island were counted by Mr. Payne and A. Christoffersen. The count on St. George Island was made by Lee C. McMillin and the writer. All rookery counts are made by two persons, thus affording a means of verifying the results. When necessary to estimate small uncountable areas a conservative figure is arrived at by close comparison with surrounding areas.

Sivutch rookery on Sea Lion Rock was visited on July 30. At that time harems were broken up, but a careful observation of the number of bulls remaining indicated that the estimated number of bulls on this rookery is very conservative. Harem areas were still so congested that it was not possible to make an accurate count, even at that late date. A very small portion of the rock was occupied by bachelors, but it is not known whether the bulls permit them to occupy this area during the more active portion of the season.

South rookery, St. George Island, maintained the abnormal increase of last season, with a resulting inaccurate figure for the average harem. As stated in previous reports, however, this will not affect the average harem for the island as a whole.

Probably due to some unusual condition, there was a wider divergence than usual in rates of growth of rookeries, as shown by the count of harem bulls and the abnormal increase in killings on some rookeries. This may be due to the early filling up of the more advantageous areas, thus requiring bulls to move to other rookeries to secure suitable harem space.

The surplus bull plays an extremely important part in increasing the rate of growth of the herd. The idle bull is a potential harem bull. He occupies a space in the rear or side of the rookery, and as the rookery fills up with cows he is likely to become a harem bull. Then additional surplus bulls appear and become idle bulls and finally harem bulls. The surplus bulls that do not become idle or harem bulls continually roam around on the outskirts of the breeding areas and hauling grounds. After the active breeding season is over, they take care of the thousands of virgin cows that arrive—this year's estimate places the number of virgin cows at 78,410. Without these surplus bulls a large proportion of the virgin females would remain unimpregnated. At that late date the harem bulls have either retired or are too exhausted to constantly move around in search of virgin cows. They prefer to find a quiet resting place away from the continual uproar of the rookeries. It is essential, therefore, to have a large number of surplus bulls, even though they interfere with driving throughout a great part of the season.

Number of harem and idle bulls, approximate ratio of idle bulls to harem bulls, and average harem, 1931

Rookery	Date	Harem bulls	Idle bulls	Total	Approximate ratio of idle bulls to harem bulls	Average harem
St. Paul Island:						
Kitovi	July 21	344	61	405	1:6	34.49
Lukanin	do	129	37	166	1:3	44.46
Gorbatch	July 15	587	108	695	1:5	51.31
Ardiguen	do	108	12	120	1:9	26.38
Reef	do	1,266	284	1,550	1:4	47.79
Sivutch (estimated)		395	80	475	1:5	46.87
Lagoon (actual count)	July 23	4		4		28.50
Tolstoi	July 21	831	194	1,025	1:4	42.86
Zapadni	July 22	657	141	798	1:5	52.10
Little Zapadni	do	413	84	497	1:5	42.24
Zapadni Reef	do	37	8	45	1:5	16.38
Polovina	July 23	353	81	434	1:4	34.84
Polovina Cliffs	do	261	63	324	1:4	25.80
Little Polovina	do	108	12	120	1:9	22.71
Morjovi	July 24	255	71	326	1:4	17.29
Vostochni	do	1,809	283	2,092	1:6	27.13
Total		7,557	1,519	9,076	1:5	38.71
St. George Island:						
North	July 20	599	121	720	1:5	39.85
Staraya Artil	do	433	92	525	1:5	41.54
Zapadni	July 22	131	53	184	1:2	19.37
South	do	91	5	96	1:18	6.54
East Reef	July 19	141	26	167	1:5	38.79
East Cliffs	do	281	72	353	1:4	55.57
Total		1,676	369	2,045	1:5	39.42
Total (both islands)		9,233	1,888	11,121	1:5	38.84

AVERAGE HAREM

The average harem has been determined through actual count of bulls and on the basis of an increase of 8 per cent over the previous year for cows. The estimated average harem for St. Paul Island is 38.71, and for St. George Island 39.42. The average harem for the two islands is 38.84; a decrease of 1.11 from the previous year. This brings the average harem down to a point which by some is considered practically ideal, although it would possibly be to the best interests of the herd to bring down the average harem somewhat lower.

It has been clearly demonstrated that the herd will increase much faster if there is a larger number of harem, idle, and surplus bulls, than if barely sufficient males for harem requirements are permitted to mature. In regard to the average harem, it is essential to consider both islands as a whole, for it is not possible to make an actual count of cows. As various conditions continually cause temporary, or permanent, increases or decreases in the number of cows and bulls on any given rookery, the present method of applying the same average rate of increase for cows to each rookery obviously results in incorrect figures for each particular rookery. It is impossible accurately to correct these errors, inasmuch as a pup count is impractical. The average harem for each island, and more particularly the average harem for the two islands as a whole, however, will be fairly correct—at least sufficiently so for all practical requirements.

Computation of breeding cows, based on annual increase of 8 per cent, and of average harems, in 1931

Rookery	Breeding cows		Harem bulls, 1931	Average harem		
	1930	1931		1931	1930	Increase (+) or decrease (−) in 1931 from 1930
St. Paul Island:						
Kitovi	10, 984	11, 863	344	34. 49	36. 37	−1. 88
Lukanin	5, 310	5, 735	129	44. 46	48. 72	−4. 26
Gorbatch	27, 889	30, 120	587	51. 31	45. 20	+6. 11
Ardiguen	2, 638	2, 849	108	26. 38	34. 26	−7. 88
Reef	56, 020	60, 501	1, 266	47. 79	49. 71	−1. 92
Sivutch	17, 142	18, 513	395	46. 87	43. 95	+2. 92
Lagoon (actual count pups)	113	114	4	28. 50	56. 50	−28. 00
Tolstoi	32, 978	35, 616	831	42. 86	45. 24	−2. 38
Zapadni	31, 693	34, 228	657	52. 10	54. 55	−2. 45
Little Zapadni	16, 155	17, 447	413	42. 24	45. 00	−2. 76
Zapadni Reef	561	606	37	16. 38	19. 34	−2. 96
Polovina	11, 389	12, 300	353	34. 84	27. 25	+7. 59
Polovina Cliffs	6, 236	6, 735	261	25. 80	30. 57	−4. 77
Little Polovina	2, 271	2, 453	108	22. 71	23. 65	−. 94
Morjovi	4, 082	4, 409	255	17. 29	18. 06	−. 77
Vostochni	45, 444	49, 080	1, 809	27. 13	29. 19	−2. 06
Total	270, 905	292, 569	7, 557	38. 71	39. 70	−. 99
St. George Island:						
North	22, 101	23, 869	599	39. 85	46. 24	−6. 39
Staraya Artil	16, 653	17, 985	433	41. 54	47. 04	−5. 50
Zapadni	2, 350	2, 538	131	19. 37	16. 32	+3. 05
South	551	595	91	6. 54	6. 41	+. 13
East Reef	5, 065	5, 470	141	38. 79	37. 80	+. 99
East Cliffs	14, 459	15, 616	281	55. 57	49. 35	+6. 22
Total	61, 179	66, 073	1, 676	39. 42	41. 09	−1. 67
Total (both islands)	332, 084	358, 642	9, 233	38. 84	39. 95	−1. 11

PUPS AND COWS

The number of cows and pups present was determined by applying an increase of 8 per cent to the number of cows computed for August 10, 1930. This average rate of increase, as determined by actual pup counts of 1917 and 1922, has been found to work out approximately correct and has therefore been used continuously since 1923.

Owing to the continual variance from year to year of the number of animals present on the several rookeries, the figures computed for each individual rookery will not be correct, but the total number, as computed for the two islands as a whole, will be very close to the actual number of animals on hand. Actual rates of increase of the total number present on both islands may also vary considerably from year to year. It is necessary, therefore, to use a conservative average rate of increase over a number of years.

The providing of a sufficient breeding reserve during the last nine years has, no doubt, resulted in a greater average annual increase for this period, but with no definite data on hand as a basis for increasing this rate, it is essential to continue to use the rate of increase established by definite facts. If the yearly rate of increase of killable 3-year-old males continues, however, it will shortly be necessary to raise the rate of increase of pups and cows. These increases in rates of growth are undoubtedly due to provision of a larger breeding reserve than was provided previous to 1923, making it possible for all females to be impregnated and resulting therefore in a greater increase in birth rate the following year.

On account of the fact that more densely populated and more favorably situated rookeries increase, as a rule, faster than the sparsely populated areas, it will also be necessary some time to make proper adjustments to show more accurately the number of animals on each separate rookery.

The proportion of dead pups found on the various rookeries in 1922 has again been applied to each rookery. For comparative purposes, to show the actual number of cows on hand, and to provide figures on which to base the increase for the following year, it is necessary to include the estimated number of dead pups in the total number of pups.

Distribution of pups on the Pribilof Islands, August 10, 1931, and comparison with distribution in 1930

Rookery	1931				1930	1931
	Living pups	Dead pups	Total pups	Per cent dead pups	Total pups	Increase
St. Paul Island:						
Kitovi	11,689	174	11,863	1.47	10,984	879
Lukanin	5,611	124	5,735	2.17	5,310	425
Gorbatch	29,861	259	30,120	.86	27,889	2,231
Ardiguen	2,781	68	2,849	2.39	2,638	211
Reef	59,618	883	60,501	1.46	56,020	4,481
Sivutch	18,061	452	18,513	2.44	17,142	1,371
Lagoon (actual count)	114		114		113	1
Tolstoi	35,121	495	35,616	1.39	32,978	2,638
Zapadni	33,639	589	34,228	1.72	31,693	2,535
Little Zapadni	17,011	436	17,447	2.50	16,155	1,292
Zapadni Reef	601	5	606	.80	561	45
Polovina	12,112	188	12,300	1.53	11,389	911
Polovina Cliffs	6,610	125	6,735	1.85	6,236	499
Little Polovina	2,391	62	2,453	2.51	2,271	182
Morjovi	4,320	89	4,409	2.02	4,082	327
Vostochni	48,059	1,021	49,080	2.08	45,444	3,636
Total	287,599	4,970	292,569	1.70	270,905	21,664
St. George Island:						
North	23,535	334	23,869	1.40	22,101	1,768
Staraya Artil	17,521	464	17,985	2.58	16,653	1,332
Zapadni	2,510	28	2,538	1.12	2,350	188
South	585	10	595	1.72	551	44
East Reef	5,387	83	5,470	1.51	5,065	405
East Cliffs	15,383	233	15,616	1.49	14,459	1,157
Total	64,921	1,152	66,073	1.74	61,179	4,894
Total (both islands)	352,520	6,122	358,642	1.71	332,084	26,558

MORTALITY OF SEALS AT SEA

No change was made in the mortality rates used this season to determine the number of seals of various ages in the herd. Though the mortality rate of seals at sea undoubtedly varies considerably from year to year, the present ultraconservative rates used answer all practical purposes to determine the approximate number of animals in the herd. It will be necessary, however, to make temporary adjustments from time to time when actual observations show a greater number of animals on hand than census figures indicate; for instance, during the present season it was very evident, from observations and actual counts, that there were at least 3,000 surplus bulls on the hauling grounds of both islands; therefore, for the present season, a deduction of 50 per cent, for losses due to fighting, natural causes, and errors in loss percentage in previous years, was not necessary. If this deduction had been made, it would have shown only 1,646 surplus bulls on hand, compared with 3,943 in 1930. Obviously, this would have been incorrect.

Observations indicate that there were more than 13,198 3-year-old males on hand on August 10. This would indicate a smaller mortality rate during a portion of their previous existence or a greater pup increase than 8 per cent, or a combination of both. However, no change has been made in mortality rates, and no adjustment has been made to take care of the apparently greater number of 3-year-olds on hand than computation indicates. No change should be made until it is fully evident that such increases or decreases will remain constant from year to year.

Reports of previous years show reasons for methods used in determining mortality rates.

COMPLETE COMPUTATION

The following complete computation shows the various methods used at present to determine the approximate number of seals of the various age classes in the herd. It will be noted that there were 81,981 more animals at the end of the sealing season of 1931 than were present at the same time the previous season. This is an increase for the herd of 7.84 per cent, as compared with an increase of 7.57 per cent in 1930. It also compares favorably with the 8 per cent increase of pups and cows.

Complete computation of fur seals, Pribilof Islands, as of August 10, 1931

Class	St. Paul Island	St. George Island	Total
Pups, estimated	292, 569	66, 073	358, 642
Breeding cows, 3 years old and over, by inference	292, 569	66, 073	358, 642
Harem bulls, counted	7, 557	1, 676	9, 233
Idle bulls, counted	1, 519	369	1, 888
Yearlings, male and female, estimated:			
Females born in 1930	135, 453	30, 590	166, 043
Natural mortality, 40 per cent	54, 181	12, 236	66, 417
Yearling females, Aug. 10, 1931	81, 272	18, 354	99, 626
Males born in 1930	135, 452	30, 589	166, 041
Natural mortality, 40 per cent	54, 181	12, 236	66, 417
Yearling males beginning 1931	81, 271	18, 353	99, 624
Yearling males killed in 1931	12		12
Yearling males, Aug. 10, 1931	81, 259	18, 353	99, 612
2-year-olds, male and female, estimated:			
Yearling females, Aug. 10, 1930	75, 253	16, 994	92, 247
Natural mortality, 15 per cent	11, 288	2, 549	13, 837
2-year-old females, Aug. 10, 1931	63, 965	14, 445	78, 410
Yearling males, Aug. 10, 1930	75, 238	16, 994	92, 232
Natural mortality, 17.5 per cent	13, 167	2, 974	16, 141
2-year-olds beginning 1931	62, 071	14, 020	76, 091
2-year-olds killed in 1931	1, 064	199	1, 263
2-year-old males, Aug. 10, 1931	61, 007	13, 821	74, 828

Complete computation of fur seals, Pribilof Islands, as of August 10, 1931—Cont'd

Class	St. Paul Island	St. George Island	Total
3-year-old males, estimated:			
2-year-old males, Aug. 10, 1930	56,745	12,929	69,674
Natural mortality, 12.5 per cent	7,093	1,616	8,709
3-year-old males beginning 1931	49,652	11,313	60,965
3-year-old males killed in 1931	38,559	9,208	47,767
3-year-old males, Aug. 10, 1931	11,093	2,105	13,198
4-year-old males, estimated:			
3-year-old males, Aug. 10, 1930	12,440	2,431	14,871
Natural mortality, 10 per cent	1,244	243	1,487
4-year-old males beginning 1931	11,196	2,188	13,384
4-year-old males killed in 1931	284	134	418
4-year-old males, Aug. 10, 1931	10,912	2,054	12,966
5-year-old males, estimated:			
4-year-old males, Aug. 10, 1930	8,805	2,522	11,327
Natural mortality, 10 per cent	880	252	1,132
5-year-old males beginning 1931	7,925	2,270	10,195
5-year-old males killed in 1931	1	1	2
5-year-old males, Aug. 10, 1931	7,924	2,269	10,193
6-year-old males, estimated:			
5-year-old males, Aug. 10, 1930	(1)	(1)	8,191
Natural mortality, 20 per cent			1,638
6-year-old males beginning 1931			6,553
6-year-old males killed in 1931			
6-year-old males, Aug. 10, 1931			6,553
Surplus bulls, 7 years old and over, estimated:			
6-year-old males, Aug. 10, 1930	(1)	(1)	5,612
Natural mortality, 20 per cent			1,122
7-year-old males beginning 1931			4,490
7-year-old males killed in 1931			
7-year-old males, Aug. 10, 1931			4,490
Surplus bulls, Aug. 10, 1930			3,963
Natural mortality, 30 per cent			1,189
Remaining surplus for 1931			2,774
Breeding bulls of 1930	8,378	1,833	10,211
Natural mortality, 30 per cent	2,513	550	3,063
1930 bulls remaining in 1931	5,865	1,283	7,148
Breeding bulls of 1931	9,076	2,045	11,121
1930 bulls remaining, deducted	5,865	1,283	7,148
Increment of new bulls in 1931	3,211	762	3,973
7-year-old males computed for 1931			4,490
Surplus bulls computed for 1931			2,774
Total theoretical bull stock, 1931			7,264
New increment of breeding bulls deducted			3,973
Surplus bulls, Aug. 10, 1931			3,291

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[1] Estimates have been worked out, in so far as possible, to show the approximate number of seals of each class which should be credited to each island. Seals do not, however, haul out in accordance with figures given. Seals born on either island frequent the other island. They travel promiscuously between and haul out on either of the two islands. The total for both islands is, however, approximately correct.

Complete computation of fur seals, Pribilof Islands, as of August 10, 1931—Cont'd

RECAPITULATION

Class	Total	Class	Total
Pups	358, 642	5-year-old males	10, 193
Cows	358, 642	6-year-old males	6, 553
Harem bulls	9, 233	Surplus bulls	3, 291
Idle bulls	1, 888		
Yearling females	99, 626	Total, 1931	1, 127, 082
Yearling males	99, 612		
2-year-old females	78, 410	Total, 1930	1, 045, 101
2-year-old males	74, 828	Numerical increase, 1931	81, 981
3-year-old males	13, 198	Per cent increase, 1931	7. 84
4-year-old males	12, 966		

FISHERY INDUSTRIES OF THE UNITED STATES, 1931[1]

By R. H. Fiedler

Chief, Division of Fishery Industries

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[1] Appendix II to the Report of the U. S. Commissioner of Fisheries, 1932. Approved for publication May 19, 1932.

FOREWORD

This report constitutes a summary of the activities of the division of fishery industries as well as an annual review on fishery statistics of the United States. As its name indicates, this division of the bureau is concerned with the activities and welfare of the fishery industries, including the commercial fisheries, the trade in fishery products, and the fish canning and preserving industries. Its functions include the collection and publication of fishery statistics, the conducting of market surveys, the prosecution of research designed to solve the technical problems of the industry, and the dissemination of authoritative and practical information to the fishery industries and the public. Results of technological investigations and marketing studies are published in separate documents as each project is completed. The information obtained from statistical surveys is published in part 2 of this report, which includes all the detailed statistical information that has become available since the issuance of the previous report,[2] together with such summarized statements and interpretations of the statistics as are deemed significant and useful. In the preparation of this report, members of the division's staff have taken part and their assistance is appreciatively acknowledged.

Part 1. OPERATIONS OF THE DIVISION

COLLECTION OF STATISTICS

The statistical work of the division in 1931, as in former years, included the collection and dissemination of statistics on the catch of fishery products and the gear employed in making the catch, and statistics of related fishery industries. In the former group are statistics that are intended for the use of the fishery biologist, upon which to base conservation measures. They are also valuable for economic purposes. This is especially true of statistics of the landings of fish at principal fishing ports, which are published monthly. In the second group are statistics that are of use mainly for economic or trade purposes. These include statistics of the manufactured fishery products and by-products of the United States, cold-storage holdings of fish and amounts of fish frozen in the United States, marine-animal oil production, and similar statistics.

Continuing with the plan of making annual general statistical surveys of the fisheries of various geographical sections, the division in 1931 under the direction of F. F. Johnson canvassed the fisheries prosecuted in our entire coastal and lake sections, obtaining catch figures for 1930. The fisheries of the Mississippi River and its tributaries were not canvassed for 1930, but a survey is now in progress in which figures for 1931 are being obtained. Continuous annual catch figures are now available for the Great Lakes from 1913, Pacific Coast States from 1922, South Atlantic and Gulf States from 1927, New England States from 1928, and the Middle Atlantic and Chesapeake Bay States from 1929. While a complete canvass has not been made for the fisheries of the Mississippi River and tributaries since 1922, annual figures have been obtained on the catch of fresh-water mussels in this area since 1929 (about 50 per cent of the total yield of fishery products in the Mississippi Valley consists of mussel shells) and for Lakes Pepin and Keokuk since 1927.

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[2] Fishery Industries of the United States, 1930. By R. H. Fiedler, Appendix II to the Report of the U. S. Commissioner of Fisheries for 1931, pp. 109–552.

In addition to the general catch statistics, the collection and (or) publication of statistics on special subjects was continued during 1931, as follows: The landings of fish by American fishing vessels at the ports of Boston and Gloucester, Mass., Portland, Me., and Seattle, Wash.; landings of halibut at North Pacific coast ports (published monthly, and annual bulletins summarizing these landings for the year); catch of mackerel in the North Atlantic fishery; cold-storage holdings of frozen and cured fish and amount of fish frozen, which are furnished by the Bureau of Agricultural Economics (published monthly); production, consumption, and holdings of marine-animal oils of the United States and Alaska (published quarterly by the Bureau of the Census); production of manufactured fishery products and by-products of the United States and Alaska during 1931; the catch of shad in the Potomac and Hudson Rivers, and the catch of alewives in in the Potomac River during 1931; transactions on the sponge exchange at Tarpon Springs, Fla., during 1931; volume of fishery products handled at the municipal fish wharf and market, Washington, D. C., during 1931; and the volume of United States imports and exports of fishery products during 1931, furnished by the Bureau of Foreign and Domestic Commerce.

In the above surveys the division continued to receive cooperation from many of the State fishery agencies, which aided materially in the work. This, together with the use of automobiles by the agents for travel, has enabled the bureau to canvass the territory more expeditiously, efficiently, and economically.

STATISTICAL CONFERENCE

On February 19, 20, and 21, 1931, the division held its second conference with its statistical agents from all sections of the country at the headquarters of the bureau in Washington, D. C. This was for the purpose of acquainting the agents with new methods for collecting fishery statistics which are intended to show the scope of the diversified interests in the industry, and also to give the agents an opportunity to discuss and solve various perplexing problems relating to the work.

The morning session of the first day Commissioner O'Malley delivered an address of welcome, which was followed by an address on statistical research in the fisheries by the writer. The program for the remainder of that day and the next two days was devoted to general discussion of the work with Fred F. Johnson as chairman.

CATCH ANALYSIS, COLUMBIA RIVER CHINOOK-SALMON FISHERY

The statistical analysis of the records of daily catches of chinook salmon made by individual fishermen on the Columbia River was continued during 1931 by Joe A. Craig, director of the Seattle (Wash.) Laboratory. The data were treated statistically in order to determine the average catch per constant unit of effort and gear of chinook salmon on the Columbia River during the period from 1905 to 1930, inclusive.

From these data indices of abundance have been made, which indicates the relative abundance of chinook salmon in this river system from year to year and during short periods of time for each individual year. In this way not only the fluctuations in abundance of the entire population of chinook of the Columbia River have been followed from one year to the next, but also indices of abundance for portions of the migrating salmon population called "runs," which are probably biologically distinct and self-maintaining, have been computed.

The investigations of 1931 consisted of a detailed consideration of the data available, and show that from 1909 to 1925, inclusive, the chinook salmon of the Columbia River appeared to withstand the strain of fishing to which they were subjected without any noticeable decline in total numbers. However, from 1926 to 1930, the catch per unit of effort and gear, which is a measure of abundance, has declined noticeably. Also, it appears that certain of the "runs" or races are suffering a more pronounced decline in numbers than others.

TECHNOLOGICAL INVESTIGATIONS

It has been said that the application of science is useful to industry during booms, is indispensable when times are normal, and vital when they become hard. Possibly this applies to the fishing industry with greater force than to any other of our basic food industries. During the past year the fisheries have passed through a most trying period. Producers and wholesalers experienced difficulty in marketing fresh and canned fishery products. The market for fish meals and oils was depressed. Some of the important fisheries have shown signs of depletion, and competition with other food products has become keener. At times like these, in order to operate successfully, it is important that losses be minimized, and that the products available be utilized to the fullest extent. The technological research of the bureau has been aimed toward this end, and where the industry has applied the results of this research to its commercial procedure it has been benefited according to the effort expended. As a result, research by the bureau has shown ways for lengthening the life of certain types of textile fishing gear; various types of fishing gear have been developed which have a greater selectivity, thereby allowing small and immature fish to escape; methods have been developed for preventing rusting and shrinkage of frozen fish in cold storage, and undue losses and food value of fresh fish shipped with ice as a refrigerant; methods also have been developed for manufacturing fish meals and oils of higher nutritional value, and chemical and biochemical studies have demonstrated the richness of some fish, shellfish, and their products in protein, minerals, and vitamins. This work has had a stabilizing influence on the fisheries, and has enabled them to carry on in a more efficient and successful manner than would otherwise have been possible.

RESEARCH ASSOCIATE

In the above lines of technological research the bureau has attacked those fundamental problems which promise to be of greatest value to the largest number and which are possible with the funds and personnel available for the purpose. For this reason, the division has not been able to study special problems affecting certain products, processes, or methods. In order to serve the industry in this connection, the bureau by congressional authorization has provided research associate facilities whereby firms or groups having special technological problems to solve will furnish the investigator and pay his salary and expenses. The investigation is carried out in cooperation with the bureau's staff in its laboratories and under its control. This makes available to the industry laboratory, consultation, and library facilities which they are unable to obtain elsewhere.

During the past year, a manufacturer of marine products took advantage of these facilities and placed a chemist in the division's laboratory to make a study of the nutritive value of kelp meal.

LABORATORIES

During the past year the division carried on its technological research work under the direction of John Ruel Manning at laboratories in Washington, D. C., and Gloucester, Mass., and has provided equipment for a laboratory in the bureau's new building in Seattle, Wash. In addition, work was conducted in other laboratories as conditions warranted. For instance, certain cooperative biochemical studies were conducted at the laboratories of the South Carolina Food Research Commission, Charleston, S. C.; at the laboratory of the Bureau of Chemistry and Soils, United States Department of Agriculture, Washington, D. C.; and at experimental farms of the Department of Agriculture and the Ohio Agricultural Experiment Station. Research on the refrigerating, salting, and smoking of fish was conducted in the Virgin Islands and in Puerto Rico, and other investigations were conducted in the field where optimum working conditions obtained.

WASHINGTON, D. C.

With the transfer of the bureau's headquarters from Sixth and B Streets SW., to the new Department of Commerce Building, Washington, D. C., the division's technological laboratories in the old quarters were dismantled and moved to the new building. Chemical, nutritional, and mechanical investigations relative to fishery products are now being carried on in these laboratories.

GLOUCESTER, MASS.

During the year, the division completed the establishment of its technological research laboratory at Fort Square, Gloucester, Mass. This has been equipped to conduct various phases of fishery technological research, including refrigeration, smoking, bacteriology, by-products, and production methods.

The laboratory is located on the second floor of a building, along the water front facing Gloucester Harbor, and has wharf facilities on two sides. This is convenient as it enables the technologists to come into close contact with the fishing fleet operating out of this port. It also enables them to obtain laboratory samples, with which to experiment, directly from vessels as a large number of them land their fares at this wharf.

The laboratory was designed and equipped by the bureau's technologists and is particularly well adapted for fishery research. Practically all of the equipment was designed for specific purposes and is particularly adapted for the study of the problems for which it is intended.

In June of 1931, two of the technologists, from the Washington staff, were transferred to Gloucester to continue their activities in this laboratory. In addition to these, and the one previously assigned there, three new technologists were appointed, for assignment to this laboratory, to assist in the studies being conducted there. The staff of this laboratory also includes a clerk and an expert mechanic.

During this transfer of activities, from Washington to Gloucester, it was necessary for the study of some of the problems to be suspended for a period. These were resumed the latter part of the year, when the laboratory had been completely equipped with the necessary apparatus.

SEATTLE, WASH.

During 1931 the division provided equipment for a technological laboratory on the second floor of the bureau's new fisheries station on Lake Union in Seattle, Wash. It is planned to begin technological investigations there in 1932, when studies will be made on the manufacture of salmon body and liver oils.

NUTRITIVE VALUE OF MARINE PRODUCTS

NUTRITION LABORATORY

In the course of the bureau's investigative work it is necessary to determine the comparative food values of various fishery products, the relative efficiency of different processes of manufacture, methods for evaluating and comparing the products experimented with by its technologists, and the effects or changes on food values resulting from manufacturing by canning, curing, smoking, and freezing. Without means for accomplishing these things there would be no standard of comparison of results or means for evaluating products produced in different ways. Thus it became essential for the proper conduct of its work to make provisions for nutrition work. Cooperative arrangements with other agencies temporarily enabled the bureau to care for some of the more pressing problems having to do with commercial products. To promote the efficiency of the program of research of its own technologists and to standardize the products of industry the bureau has provided nutrition laboratory facilities and began experimental work in its own laboratory in Washington, D. C., in July, 1931. This has been one of the most important contributions made in recent years to the effectiveness of its own work and productive of beneficial results to industry.

BURBOT-LIVER OIL

Under a working arrangement with the Bureau of Chemistry and Soils, United States Department of Agriculture, as described in the 1929 and 1930 reports of this division, Dr. Chester D. Tolle, of the bureau, and Dr. E. M. Nelson and Dr. G. S. Jamieson, of the Bureau of Chemistry and Soils, completed an investigation concerning the chemical and physical properties and vitamin content of burbot-liver oil, in which it was shown that commercially produced burbot-liver oils were from four to ten times as potent in vitamin A and from three to four times as potent in vitamin D as medicinal cod-liver oil. It was also shown that these oils meet the United States Pharmacopœia X requirements for cod-liver oil with respect to specific gravity, iodine number, acid value, and unsaponifiable matter. The saponification values were approximately equal to the maximum permitted for cod-liver oil.

ANTIANEMIC PROPERTIES OF OYSTERS

Through a cooperative arrangement with the South Carolina Food Research Commission, Charleston, S. C., E. Jack Coulson, of the bureau has made a study in the laboratories of this commission of the antianemic properties of oysters. Samples of oysters were gathered from the most important oyster beds of the Atlantic and Gulf waters and analyzed for iron, copper, and manganese.

From this study it is possible to group the samples into three distinct groups: (1) North Atlantic, with high copper, low iron, and low manganese, (2) South Atlantic, with high iron, low copper, and low manganese, and (3) Gulf, with high iron, low copper, and high manganese. When the oysters from different localities were fed to anemic animals they all induced regeneration of hemoglobin. The response of hemoglobin regeneration was directly proportional to the amount of iron present, thus indicating that copper was not the controlling factor. This investigation demonstrates the importance of oysters as a source of iron in addition to their other food factors. It also was demonstrated that the ether-soluble material in oysters saponified with alcoholic potash carries appreciable quantities of vitamin D.

A great deal of interest has been shown in fish flour as a result of cooperative investigations in which this product forms a part of the diet for children. These investigations which started about May, 1931, are still in progress and, therefore, no definite report can be made at this time.

To correlate its laboratory studies on the nutritive value of fishery products with the actual feeding of these products to farm animals, the bureau is cooperating with the United States Department of Agriculture, Bureau of Animal Industry, Experimental Farm, Beltsville, Md., and the Ohio Agricultural Experiment Station, Wooster, Ohio, in extending its nutrition studies to farm animals, such as poultry, sheep, swine, cattle, etc.

KELP-MEAL EXPERIMENTS

A series of cooperative experiments with a producer of kelp meal have been conducted by Dr. H. P. Morris, a research associate, in the Washington laboratory to determine the nutritive value of kelp meal. One experiment of this series was conducted to learn the optimum level at which kelp meal can be fed as an addition to an otherwise complete diet composed of natural foodstuffs.

The additions of kelp meal were made to the diets of albino rats at levels of 3, 6, and 10 per cent. As a result it was found that no essential difference in response was observed for the rats at any of the levels studied. The amount of kelp meal included in the ration, therefore, is dependent upon the cost of this product. Another group of animals was fed kelp meal at levels of 15, 22½, and 30 per cent. These animals showed no ill effects from the injection of diets containing these levels of kelp meal, and the rats were not affected by the large quantities of salt that would be contained in these amounts of kelp meal.

Another experiment was conducted to determine the ability of kelp meal to stimulate appetite. According to results obtained it appears that kelp meal has a beneficial effect in increasing both growth and food consumption. If it can be shown that kelp meal will be an aid to production of animals for early market maturity it will make this product of considerable value in the field of animal industry especially in the production of such products as hothouse lambs, broilers, etc.

Another experiment was conducted to determine the vitamin A content of kelp meal. It was shown that this product contains about one-fourth as much of vitamin A as alfalfa hay, approximately the same amount of vitamin A as fresh eggs, and one and one-half times as much of this vitamin as yellow corn. It is thus seen that kelp meal is a fairly good vegetable source of vitamin A, but could not compete with cod-liver oil and other fish oils as a source of vitamin A for animal feeding.

Further experiments were designed to test the supplementary value of kelp meal when added to rations containing various protein supplements. The results obtained showed that kelp meal has a very favorable effect on growth when fed in diets composed principally of ground yellow corn and cottonseed meal. The extra growth resulting from the addition of kelp meal was not due to the sodium and potassium salts contained in the kelp since quantities of these salts similar to the amounts contained in kelp meal were added to the control diet. These experiments indicate that kelp meal has a very definite supplementing effect on diets composed of corn and cottonseed meal thereby increasing the rate of growth with less food consumption per unit gain in weight.

PRESERVATION OF FISHERY PRODUCTS FOR FOOD

IMPROVED METHODS FOR HANDLING OF FRESH AND FROZEN FISH

It is known that fish begins to deteriorate immediately following death and that certain definite chemical changes occur during this decomposition. These chemical changes are the same whether the fish is preserved by ice, in a frozen state, or without preservation. Studies of these chemical changes by James M. Lemon show that the rate of decomposition is determined by the degree of preservation, this being retarded by icing or freezing. With this in mind research was directed toward developing a chemical means for determining the condition of the flesh as to freshness, age, or stage of decomposition. The method developed proved successful in the laboratory but is quite complicated and requires technical skill for operation. However, this method is being simplified so that it may have commercial application.

IMPROVED METHODS FOR SMOKING FISH

In general commercial procedure it has been difficult to produce a uniform smoked fish product for the reason that no standards have been established for the methods involved or for the finished product.

In order to assist the industry in this respect the division is conducting a study of the smoking of fish.

During the past year James M. Lemon designed and had constructed at the Gloucester Laboratory an experimental smokehouse and with the assistance of Maurice E. Stansby, conducted studies on the smoking of fish. The smokehouse is portable and is constructed to reduce the fire hazard to a minimum. The smoke is produced in the lower section by feeding sawdust onto an electric hot plate. This sawdust is fed automatically from a hopper onto the electric burner, where it is mechanically distributed over the surface to produce an even smoke. The volume of smoke can be controlled by adjusting the speed with which the sawdust is fed into the burner. A blower forces the smoke from the burner, through the upper section or smoking compartment, thence to an exhaust to the air outside. A draught regulator is attached to this system which makes it possible to produce as rapid circulation as may be desired.

The smoking compartment in which the fish are hung is heated by an electric heater, the temperature of which can be accurately controlled. This makes it possible to study the effect of different temperatures on the fish.

The humidity in the smoking compartment is controlled by means of a water spray. This may be employed to increase the amount of moisture present in the smoke. Circulation of the smoke in this compartment is accomplished by an agitator. A continuous record of the temperature and humidity of the smoking compartment can be kept by means of recording instruments.

It is possible to duplicate previous results by manipulating the controls regulating the volume of the smoke, temperature, and humidity. Application of this method to commercial procedure should remove much of the guesswork from the art of smoking and enable producers to manufacture a uniform product.

BACTERIOLOGICAL STUDIES

In the marketing of fresh fishery products and in their preservation by freezing, drying, salting, smoking, or canning various bacteriological changes take place which may hasten decomposition, contribute to preservation, or otherwise influence the manufacture of the finished product. These changes have received little attention by research workers with the result that losses in the fisheries, due to lack of knowledge of bacterial action, are enormous. In an effort to improve those processes or methods affected by bacteria the division established a bacteriological laboratory at its technological station in Gloucester, Mass. This research work during the past year was conducted by Francis P. Griffiths and has been concentrated upon determining the germicidal effect of smoke on fish and the nature of molds on smoked fish and their prevention. The bacteriology of fresh and frozen fish also has received attention. In this connection, it has been definitely shown that wounds produced in forking fish are fertile breeding grounds for bacteria.

PRESERVATION OF FISHERY PRODUCTS IN THE VIRGIN ISLANDS AND PUERTO RICO

The fisheries of the Virgin Islands and Puerto Rico are only slightly developed, and the inhabitants import considerable quantities of cured fishery products. After comprehensive economic surveys of these islands by Norman D. Jarvis and the writer it was determined that the quantity of fish caught locally could be increased, and that the market could be expanded (1) by building up the market for fresh fish through the introduction of improved methods of handling and the use of ice; (2) by the establishment of a local fish-curing industry to provide a home product to replace imported cured fish.

It was found that methods of handling were primitive and unsanitary and that the use of ice was almost unknown. For these reasons fish less than a day old are believed to have caused food poisoning and considerable quantities of fish have had to be thrown away through spoilage. Experimental studies by N. D. Jarvis on icing and handling fish indicated that fresh fish products superior to any then marketed could be prepared, with a greatly extended period of preservation, and that local fish could be cured successfully.

Series of experimental packs of dry-salt fish were prepared in both St. Thomas and Puerto Rico. A method was developed, based on previous studies by the bureau on the salting of fish, by which a product equal to any imported dry-salt fish can be prepared from fish caught locally around these islands. Data obtained indicate that this fish will not spoil readily. It was found possible to utilize almost all of the larger food fish in the preparation of dry-salt fish, but dry-salt barracuda was found to be the best all-around product.

The disposal of smaller food fish is a problem to the local fishermen and dealers. The study indicated that smoking might be utilized for the curing of these smaller fish, and a product prepared for which there would be more demand. Several lots of fish were smoked by a method suited to local conditions.

Instruction was given to fishermen and others in the islands for the proper handling and icing of fresh fish, the preparation of dry-salt fish, the construction of a smokehouse and the preparation of smoked fish, all of which should lead to placing the fishing industry on a sounder basis.

PRESERVATION OF FISHERY BY-PRODUCTS

In the fall of 1930, the bureau discontinued operation of its by-products laboratory at Reedville, Va., and installed larger and more complete equipment for by-products' studies as a part of the technological laboratory established at Gloucester, Mass. This move entailed the shipping of all equipment to Gloucester, the renovation of the new quarters, and the assembly and installation of the equipment shipped from Reedville as well as the assembly and installation of additional equipment for use in the new laboratory.

With the installation of the equipment in the Gloucester Laboratory, Roger W. Harrison assisted by Andrew W. Anderson and Samuel R. Pottinger initiated four major by-products investigations. These were: (1) A study of improved methods of manufacturing fish meal from nonoily fish waste, (2) a study designed to develop, from fillet waste, a fish flour which would be suitable for human consumption,

(3) a study of the chemical, physical, and biological constants of haddock-liver oil and, (4) a study designed to improve the technical usefulness of fish oils. Inasmuch as these investigations are studies of major importance and entail a great amount of experimental work over an extended period of time, it was not possible to bring any of them to completion during the few remaining months of the past year. Accordingly, the following may be considered only as a progress report of the work accomplished at the time of this writing.

IMPROVED METHODS FOR MANUFACTURING FISH MEAL FROM NONOILY FISH WASTE

The increasing interest in the use of fish meal as an animal feedstuff makes it highly desirable for the industry to manufacture fish meal of high quality. Fish offal or waste is a perishable material composed of complex inorganic and organic compounds. These latter materials are subject to change during the process of manufacture, and it is, therefore, essential to understand such changes so that those which tend to lower the quality of the products as an animal feed can be eliminated. For this reason, the scope of the investigations on methods of manufacturing fish meal includes studies to determine effect of: (1) Temperature, (2) length of drying time, (3) type of heating medium, and (4) method of applying heat on, (*a*) the nutritive value, (*b*) the chemical composition, and (*c*) the appearance of the product.

In order to carry on the work it has been necessary to: (1) Develop experimental apparatus, (2) conduct tests on such apparatus, (3) test samples for biological value, and (4) make chemical analysis of the finished products.

The preliminary results obtained to date, while not sufficient to warrant conclusions, indicate that both temperature and length of drying time have a noticeable effect upon the quality of the product. That is, high drying temperatures and long drying periods, within certain limits, detract from the nutritional value of the meal. Inasmuch as the elimination of one ordinarily results in the magnification of the other much remains to be done in determining optimum operating conditions. The study of type of heating mediums and methods of applying heat may be expected to aid in the solution of this problem. The biological tests are being carried on in cooperation with the Ohio Agricultural Experiment Station at Wooster, Ohio.

DEVELOPMENT OF FISH FLOUR SUITABLE FOR HUMAN CONSUMPTION

In the preparation of certain fish for market, as packaged products, a considerable quantity of material is accumulated which is suitable for human consumption. This material consists essentially of the backbones and the flesh adhering to them.

In view of recent studies in nutrition, this material constitutes an extremely valuable supplement to the human diet. Nutrition experts are showing the importance of certain mineral elements in the diet; and analysis of fish waste shows that these elements are found in relatively abundant proportion in this material ranging from 6 to 28 per cent of minerals. A flour prepared from the edible portion of fish trimmings, therefore, should prove a valuable food product.

The scope of the studies being made on the manufacture of this product include the development of a method of manufacture whereby: (1) The original nutritional value will be altered as little as possible, (2) the resultant product will stand up in color and taste during storage, and (3) the flour will lend itself to satisfactory inclusion in food recipes. Preliminary data indicate that these requisites can be realized more closely by an extremely rapid removal of moisture at relatively low temperatures.

The work accomplished during the latter part of the past year has consisted in the design and construction of an apparatus which will disperse the fish material in a drying medium in such a manner that extremely rapid drying can be effected. Preliminary studies on the nutritional value of this material have shown that different portions of the waste are more nutritious than others.

HADDOCK-LIVER OIL

The increasing catch of haddock in the New England ground-fish fishery has made it imperative that more be known concerning the chemical nature and biological value of haddock-liver oil. This is especially true since it is believed by some that the present specifications for cod-liver oil, as stated in the United States Pharmacopœia, place the producers of haddock-liver oil at a distinct disadvantage; although the intention of the Pharmacopœia is to permit the use of haddock-liver oil along with cod-liver oil. At the present time but a very small portion of the domestic supply of fish livers is converted into oil, and any stimulation toward increased production of domestic liver oil would be of considerable service to the fishing industry.

The scope of the investigation now under way includes a study of the oil rendered from livers removed from haddock taken on all the important fishing grounds during an entire year. The data which are being correlated consist of: (1) Date of catch, (2) location of fishing ground, (3) color of oil, (4) specific gravity, (5) refractive index, (6) free fatty acid content, (7) unsaponifiable matter, (8) saponification number, (9) iodine number, and (10) vitamin potency.

The data obtained up to the present writing show that haddock-liver oil is subject to considerable variation with regard to some of its physical and chemical properties. Further, on the basis of the trend of these data, which includes the period from September to December, some of these properties during the warmer seasons may be expected to fall beyond the limits of the Pharmacopœia.

IMPROVING THE TECHNICAL USEFULNESS OF DOMESTIC FISH OILS

One of the important problems facing the fish oil industry in this country is to find a better market for its output. In order to be of assistance to the fish oil industry in this connection, the bureau has undertaken a study to relieve this situation. The work on this problem at the present time is concerned with the natural variations in the properties of the oils from different sources; since one of the principal objections made by consumers of fish oils is their apparent lack of uniformity. On the basis of the data obtained it is hoped, as the first step, to be able to recommend when the various oils are most nearly fitted for the many uses which can be made of them.

NET PRESERVATION

As a result of the bureau's work on net preservation conducted by W. T. Conn a method of protecting heavy nets, such as traps, pounds, fykes, and seines, from deterioration has been developed. This makes use of toxic dyes applied to the thread or net. When these are used in connection with a specification coal tar, the tensile strength of exposed cable cotton has been extended beyond a degree previously thought possible. Specifically, tensile strength of 15-thread cable cotton, so preserved, increased constantly in all tests, during the season of greatest deterioration, between June and December. Crystal violet is considered the best dye for this service, but malachite green and thioflavine-S have proven only slightly inferior. Sources of supply of this dyed twine are now established and are available for prospective buyers.

A study of tars used for preserving nets has shown that many tars are of an inferior quality for net preservation. With the aid of the above test and through developmental work with tar it has been possible to prepare a tar which has maximum preservative qualities. Specifications for this net preservative tar have been drawn up, for the first time as far as known, and supplies of this specification coal tar certified for quality by the manufacturer are now available to fishermen.

While the above application prevents deterioration and preserves tensile strength, it does not entirely eliminate weed growth on the net. It is possible to retard this weed growth or fouling by adding certain copper compounds to the coal tar dip applied to dyed twine. The reduction of fouling, however, is effected at some sacrifice to tensile strength.

Studies also were continued on developing formulæ for preserving light nets such as gill nets, trammel nets, and the like. As a result of this the value of copper oleate and chicle as preservatives, as previously reported, were confirmed. In addition, tung and pine oils were found to have value as preservatives for light nets.

While certain preservatives have been efficacious in prolonging the life of light nets, an investigation on gill nets fished by a vessel out of Portland, Me., during the summer of 1931, has shown that many nets in this type of fishery deteriorate because of improper cleansing and storage. This deterioration can be retarded to a great extent by washing the net with lime water as soon as possible after each fish haul, and rinsing with clear water. The net should be removed from the reel as soon as dry, as direct sun rays injure the dry fabrics. A boxed damp net should never be covered, and when nets are to be stored they should be thoroughly cleansed, dried, and suspended in dry, well-ventilated shade.

Information obtained during research upon the preservation of fish nets indicates that the useful life of rope may be extended with comparatively little expenditure of time and money. It is possible that the toxic dye treatment described above for fish nets may be of value in this connection. However, it has been demonstrated by laboratory test that the dye must be applied to the hemp before the yarn is laid. Experiments in this direction have been made possible through cooperative research between this bureau and the Bureau of Construction and Repair, Navy Department. Preparation of test material is in progress at the naval rope factory at Boston, Mass., under personal direction of a technologist from this bureau.

MARKET AND INDUSTRIAL SURVEYS

Market and industrial surveys are made to supply the trade with useful market information regarding the distribution and consumption of fishery products and to supply descriptive and economic data on our fisheries and fishery industries.

SOME UNUSUAL MARKETS FOR FISH AND SHELLFISH

During 1931 surveys were made of the methods of several unusual markets for fish and shellfish by F. F. Johnson. These included commercial sport fishing in privately stocked waters, hot-fish shops, clambakes, oyster roasts, oyster suppers, fish frys, etc.

The survey of commercial sport fishing covered 40 firms which it is estimated comprise 80 per cent of such firms in the United States. In addition, it covered 19 hatchery firms who indicated their intentions of opening commercials pools. Some of these latter firms already have pools under construction. The investment in sport fishing waters and in hatcheries operated by sport fishing concerns exceeded $500,000 during the fiscal year ended September 30, 1931. The species used in these enterprises were usually rainbow and brook trout although some firms reported that cutthroat trout, black bass, and bullheads were used. About 322,000 pounds of fish were taken by some 29,000 sport fishermen during the year. Customary charges for fishing varied from 65 cents to $1 per pound of fish taken.

It is estimated that sales through the hot-fish shops of Great Britain account for nearly 70 per cent of the fish landed in the country. The closest semblance to this type of trade in the United States is the hot-fish business in and around St. Louis, Mo. More than one-fourth of the total supply of whiting taken in the fisheries of the Middle and North Atlantic coasts are used in this trade. They are frozen shortly after capture near the fishing centers and usually reach the St. Louis markets in carload lots. The study of the development of the hot-fish trade in the St. Louis area has suggested the possibility of similar activities in other cities.

Clambakes and oyster roasts are old American institutions which have been borrowed from our aboriginal predecessors and celebrated by all our generations much after the traditional fashion. A discussion of the methods of these functions has been deemed advisable due to the general lack of detailed information concerning them.

The full report of these marketing phases as well as of other unusual markets is contained in Fishery Circular No. 11 entitled "Some Unusual Markets for Fish and Shellfish." It may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C.

PUERTO RICO

Believing that the fishery resources of Puerto Rico were largely undeveloped and that methods for preserving and marketing fishery products in the island were inefficient, Gov. Theodore Roosevelt requested the Bureau of Fisheries to make an economic survey of the situation and to suggest procedures leading toward fuller development. In order to aid in this respect the bureau detailed N. D. Jarvis to undertake this work in cooperation with the Bureau of Commerce and Industry of Puerto Rico. The survey began on July 15 and was completed on November 19, 1931.

The results of the survey indicated that this belief was well founded. It was found that 87 per cent of all fishery products used was imported from other countries. The greater part of this was cod and other dry salt fish mostly from Nova Scotia and Newfoundland. The annual per capita consumption of fish is low as compared with near-by islands. This is about 14 pounds in the edible portion, as compared with a per capita consumption of 32 pounds in the near-by Virgin Islands. Fish are iced for shipment in only three localities. It is not the custom to use ice when retailing fish either while on display at retail stores and fish markets or in peddling in the streets and around the country.

Fish are not gutted, cleaned, or given anything approaching careful handling either by the fisherman or dealer. In addition, the native retail trade is reluctant to accept dressed fish. Gutting is believed to be a method of concealing inferiority. As a result much of the fish is stale, fresh fish is not sold in inland towns, and in comparatively small amounts along the coast. Consumption is decreased even where fish is available through fear of "fish poisoning." This is thought to be caused principally by eating stale or tainted fish.

While the catch may be increased somewhat on all sections of the coast, only two areas ar believed capable of producing catches much larger than those now taken. These are the grounds around the eastern and western ends of the island with Fajardo and Puerto Real as central points. These towns are even now the largest source of supply for San Juan, the principal market. Fish is shipped in metal-lined boxes by motor truck and is from four to nine hours on the road.

Sufficient supplies of raw material are apparently not available for the operation of a fish-reduction plant on a profitable basis.

Having concluded the market survey, the bureau's technologist remained on the island to develop methods for handling the catch. A résumé of this work is discussed on page 106 of this report.

PUBLICATIONS OF THE DIVISION

During the calendar year 1931 the following publications were prepared by members of the division. This list does not include the monthly statistical bulletins of the landings of fishery products at Boston and Gloucester, Mass., Portland, Me., and Seattle, Wash., nor the monthly reports on cold-storage holdings of frozen fish and quantities of fish frozen. The fishery documents, reports, and circulars may be purchased at the prices shown from the Superintendent of Documents, Government Printing Office, Washington, D. C. The statistical bulletins and special or S-memoranda are distributed free of charge upon request to the bureau. The special articles may be obtained from the sources of publication.

Those wishing to receive current copies of this report and statistical bulletins issued by the bureau should request that their names be placed on the bureaus' mailing lists No. 128 for the annual statistical report, 128a for general statistical bulletins, and 128b for monthly cold-storage reports. Those desiring historical statistical data on the domestic fisheries for the period 1880 to 1929 should consult the report entitled "Fishery Industries of the United States, 1930," by R. H. Fiedler, Appendix II to the Report of the U. S. Commissioner of Fisheries for the fiscal year 1931.

DOCUMENTS, REPORTS, AND CIRCULARS

Cobb, John N.
- Pacific salmon fisheries. 8°, 293 pp., 48 figs. Fishery Document No. 1092. 65 cents.

Conn, W. T.
- Application of preservatives to fishing nets. 8°, 6 pp., 5 figs. Fishery Economic Circular No. 74. 5 cents.

Daniel, Esther Peterson, and E. V. McCollum.
- Studies on the nutritive value of fish meals. 8°, 19 pp., 6 figs. Fishery Investigational Report No. 2. 5 cents.

Fiedler, R. H.
- Fishery industries of the United States, 1930. Appendix II, Report of Commissioner, 1931. 8°, 444 pp., 21 figs. 80 cents.

Harrison, Roger W.
- The menhaden industry. 8°, 113 pp., 30 figs. Fishery Investigational Report No. 1. 25 cents.
- Market for marine animal oils in the United States. 8°, 78 pp., 17 figs. Fishery Investigational Report No. 7. 15 cents.

Harrison, Roger W., and S. R. Pottinger.
- Commercial production of menhaden fish oil for animal feeding. 8°, 11 pp., 1 table. Fishery Investigational Report No. 4. 5 cents.

Lemon, J. M.
- Market for fresh oysters in fourteen cities of the United States. 8°, 25 pp., 6 figs. Fishery Circular No. 3. 10 cents.

Lucas, Clarence R.
- Review of the fish-farming industries of the United States. 8°, 16 pp., 7 figs. Fishery Circular No. 2. 5 cents.

Manning, John Ruel, E. M. Nelson, and Chester D. Tolle.
- Vitamin D in menhaden fish oil. 8°, 5 pp., 1 fig. Fishery Investigational Report No. 3. 5 cents.

SPECIAL ARTICLES

Conn, W. T.
- Standard preservatives for fish nets. Commercial Standards Monthly. February, 1931. Washington.
- Application of preservatives to fishing nets. Fish and Oyster Reporter. June, 1931. Tampa, Fla.
- Net preservative research, 1926–1929. Technological Report No. 1, 1931. Available for reference only at the United States Bureau of Fisheries Library, Department of Commerce, Washington.
- Net preservative research, 1930. Technological Report No. 2, 1931. Available for reference only at the United States Bureau of Fisheries Library, Department of Commerce, Washington.

Fiedler, R. H.
- Statistical research in the fisheries. Address before second statistical conference of the division of fishery industries. Washington, February 19, 1931. Published in United States Daily, March 26 and 27, 1931. Washington; Bureau of Fisheries Memorandum S–325, 1931. Washington.
- Trade in fresh and frozen fishery products. Fish and Oyster Reporter. March, 1931. Tampa, Fla.
- Fish supply of nation subject to investigation. Louisiana Conservation Review. May, 1931. New Orleans.
- Progress in commercial fisheries. Address before Southern Fisheries Association. Jacksonville, Fla., June 10, 1930. Published in Fish and Oyster Reporter, June, 1930. Tampa, Fla.
- The package fish trade. Fishing Gazette Annual Review number, June 15, 1931. New York.
- How Federal bureau aids fishing industry. United States Daily, June 24, 1931. Washington. Louisiana Conservation Review, November, 1931. New Orleans.
- Problems connected with freezing fish. United States Daily, June 25, 1931. Washington. Louisiana Conservation Review, October, 1931. New Orleans.
- The growth of the packaged fish trade. Maryland Fisheries, No. 11, July, 1931. Baltimore.

Fogelberg, John M.

Deterioration of fish nets in fresh water. Technological Report No. 3, 1931. Available for reference only at the United States Bureau of Fisheries Library, Department of Commerce. Washington.

Harrison, Roger W.

Standards in the manufacture of fish meal. Commercial Standards Monthly, November, 1930. Washington.

Suggestions for storing fish oil. Fishing Gazette, January, 1931. New York.

Significance of recent rapid growth in whale oil production. Address before American Oil Chemists Society in Chicago, Ill., October 30, 1931. Published in Soap, November, 1931. New York. Bureau of Fisheries Special Memorandum 1721–23. Washington.

Jarvis, N. D.

The following articles were published in the Daily News at St. Thomas, Virgin Islands, 1931. Preservation of fish, June 19 and 22. Value of fish as food, June 24. Salting of fish, June 25. Smoking fish, June 27, Processes recommended for dry-salting fish in the Virgin Islands, July 13. Recommendations for handling fresh fish in the Virgin Islands, July 15.

The following articles were published in the Puerto Rico Progress, San Juan, Puerto Rico, 1931. Fisheries of Puerto Rico, August 27. Food value of fish, September 3.

The following articles were published in El Mundo (Spanish) San Juan, Puerto Rico, 1931. Problems affecting fisheries development in Puerto Rico, September 6. How to salt fish in Puerto Rico, October 29. How to build a smokehouse and smoke fish, November 1.

Observations on the fisheries of Puerto Rico. El Imparcial (Spanish), September, 1931. San Juan, Puerto Rico.

Johnson, F. F.

Compiling data on scope of fishing industry. United States Daily, September 12, 1931. Washington.

Statistics on production of canned fish. United States Daily, November 12, 1931. Washington.

Lemon, J. M.

Standards for refrigeration of fish. Commercial Standards Monthly, March, 1931. Washington. Ice and Refrigeration, April, 1931. Chicago. United States Daily, May 5, 1931. Washington.

Development of processes for preserving foods. United States Daily, November 13, 1931. Washington.

Manning, John Ruel.

Fish meal for poultry feeding. Poultry Success, January, 1931. Springfield, Ohio.

Seafoods yield iodine essential to balanced diet. Louisiana Conservation Review, January, 1931. New Orleans.

New dietary standards developed. Commercial Standards Monthly, January, 1931. Washington. Flour and Feed, February, 1931. Milwaukee.

Marine products in our national dietary. Address before District of Columbia Medical Society, Washington, D. C., March 11, 1931. Published in Bulletin of Medical Society of the District of Columbia, July, 1931. Washington. Bureau of Fisheries Special Memorandum 2468, Washington. Fish and Oyster Reporter, May, 1931. Tampa, Fla.

Seafood more important in diet as soil minerals are depleted. United States Daily, March 17, 1931. Washington.

Seafood said to furnish iodine in palatable form. United States Daily, March 21, 1931. Washington.

Discussion on diet and dentition. Address before the District of Columbia Dental Society, Washington, D. C. Published in the Dental Cosmos, April, 1931. Philadelphia.

Marine products a source of iodine. Flour and Feed, May, 1931. Milwaukee. The place of marine products in animal nutrition. Feedstuffs, May 30, 1931. Minneapolis.

Manufacture and uses of marine products with relation to animal nutrition. Address before American Feed Manufacturers' Association, French Lick Springs, Ind., June 5, 1931. Published in Feed Bag, June, 1931. Milwaukee. Feedstuffs, June 6, 1931. Minneapolis. Flour and Feed, July, 1931. Milwaukee. Bureau of Fisheries Special Memorandum 2255A. 1931. Washington.

Manning, John Ruel—Continued.
- Analyzing food value of fishery products. United States Daily, September 14, 1931. Washington.
- The relation of public institutions to public health and child welfare. Radio address over station WRC, Washington, D. C., October 12, 1931. Bureau of Fisheries Special Memorandum 2482, 1931. Washington.

Tolle, Chester D.
- Discussion on diet and dentition. Address before District of Columbia Dental Society, Washington, D. C. Published in The Dental Cosmos, April, 1931. Philadelphia.

Tolle, Chester D., and E. M. Nelson.
- Salmon oil and canned salmon as sources of vitamins A and D. Address before Division of Biological Chemistry, American Chemical Society, Indianapolis, Ind., April 1, 1931. Published in Industrial and Engineering Chemistry, September, 1931. Washington.

STATISTICAL BULLETINS

Fisheries of the New England States, 1929. Statistical Bulletin No. 926.
Fisheries of the Middle Atlantic States, 1929. Statistical Bulletin No. 923.
Fisheries of the Chesapeake Bay States, 1929. Statistical Bulletin No. 908.
Fisheries of the South Atlantic and Gulf States, 1929. Statistical Bulletin No. 925.
Fisheries of the Pacific Coast States, 1929. Statistical Bulletin No. 930.
Lake fisheries, 1929. Statistical Bulletin No. 933.
Fisheries of the United States and Alaska, 1929. Statistical Bulletin No. 928.
Production of cured fishery products in the marine and lake sections of the United States and Alaska, 1929. Statistical Bulletin No. 932.
Canned fishery products and by-products of the United States and Alaska, 1930. Statistical Bulletin No. 927.
Production of fresh, frozen, and smoked packaged fishery products in the United States, 1930. Statistical Bulletin No. 924.
Fishery products frozen and cold-storage holdings of frozen and cured fishery products in the United States and Alaska, 1930. Statistical Bulletin No. 920.
Fisheries of Alaska, 1930. Statistical Bulletin No. 922.
Landings by fishing vessels at principal New England ports, 1930. By months. Statistical Bulletin No. 911.
Landings by fishing vessels at the three principal New England ports, 1930. By gear and fishing grounds. Statistical Bulletin No. 912.
Fishery products landed by United States vessels at Seattle, Wash., 1930. By banks. Statistical Bulletin No. 913.

Part 2. FISHERY STATISTICS [3]

REVIEW, 1930

GENERAL

The catch of fishery products in the United States and Alaska during 1930 was slightly less than in the previous year. The value of the catch also decreased as compared with 1929. The value of the output of canned fishery products and by-products in 1930 decreased as did the production of packaged fish. The output of cured fishery products increased slightly in quantity in 1930 as compared with the previous year but decreased in value. The production of frozen fish increased over 1929, and both imports and exports of fishery products decreased as compared with 1929.

During 1930, the domestic fisheries employed about 120,000 persons as fishermen, 4,500 on transporting craft, and about 86,000 were engaged in the wholesale and manufacturing industries, a total of 204,000 persons, exclusive of duplication. The catch amounted to 3,286,580,000 pounds, valued at $109,349,000.

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[3] With reference to the figures published in part 2 the reader should refer to that section in the latter part of the book entitled "Statistical survey procedure" which gives in detail methods for collecting statistics, compilation practices and conversion factors. This is most necessary for a complete understanding of the statistics presented herewith.

In 1930, in the marine and lake sections of the United States and Alaska, the production of canned fishery products amounted to 577,783,000 pounds, valued at $83,015,000; and the output of by-products was valued at $19,560,000. The production of fresh and frozen packaged fishery products amounted to 157,378,000 pounds, valued at $28,996,000. The production of cured fishery products amounted to 124,497,000 pounds, valued at $16,837,000. The pack of frozen fishery products in the entire United States and Alaska amounted to 139,297,000 pounds, estimated to be valued at $16,500,000. In addition, it is estimated that $5,000,000 worth of fishery products were cured or manufactured into by-products in the Mississippi River and tributaries section during 1930—making the total value of all manufactured products in the entire United States and Alaska in 1930 about $170,000,000.

Fishery products imported for consumption were valued at $50,830,000, while domestic exports were valued at $17,276,000.

NEW ENGLAND STATES

The most recent general statistics of these States, which are for 1930, show that the catch exceeded that in any year for which there are records, although the value of the catch was exceeded in 1929. The catch increased 1 per cent in quantity and decreased 5 per cent in value as compared with the catch and its value in the previous year. Larger catches of ground fish offset the considerable decrease in sea herring and mackerel. Landings of fish at Boston, Gloucester, and Portland were the largest on record during 1930, although the value of these fish was somewhat less than in the previous year.

The output of packaged fish registered a decline of 7 per cent as compared with that in 1929. The frozen fish trade shows a considerable increase in 1930 over the previous year. The production of sardines, which is the principal fish-canning industry in this section and is centered in Maine, showed a large decrease as compared with the previous year. The cured-fish industry decreased in volume as compared with 1929.

MIDDLE ATLANTIC STATES

The catch of fishery products of the Middle Atlantic States in 1930 exceeded that in any year for which there are records. The value of the catch was slightly less than in 1929, the largest on record. The increased catch is due largely to the increase in volume of menhaden and alewives, while the decrease in value is due mainly to a smaller production in the oyster industry.

Landings of fish at New York City and Groton, Conn., which consisted largely of haddock, flounders, cod, mackerel, and tilefish, decreased considerably as compared with 1929. The packaged fish-trade decreased also, as did the trade in frozen fish. The catch of shad in the Hudson River increased slightly over 1929. The production of cured fish showed a considerable increase over the previous year.

CHESAPEAKE BAY STATES

In 1930, the catch of fishery products of the Chesapeake Bay States exceeded that in the previous year. The value of the catch was slightly less. However, the catch was the smallest on record since 1888, with the exception of 1929. The decline in the volume of the menhaden catch has been largely responsible for this decrease in the total catch. The catch of shad in the Potomac River during 1930 was much less than that in 1929, but the catch of alewives increased slightly. The production of packaged fish was about the same as in 1929. The production of cured fish was considerably larger than during the previous year. The value of the production of menhaden products in 1930 was approximately the same as that in 1929.

SOUTH ATLANTIC AND GULF STATES

Statistics of the fisheries of the South Atlantic and Gulf States for 1930 show a considerable decrease in the catch of fishery products and the value of the catch as compared with the previous year. This is due largely to decreases in the volume of the catch of menhaden, oysters, and shrimp. There was a considerable increase in the production of packaged fishery products as compared with 1929. The production of cured fishery products also was greater than during the previous year.

There were decreases in the production of canned oysters and shrimp as well as menhaden products. The manufacture of each of these products is an important industry in this section.

PACIFIC COAST STATES

Statistics of the fisheries of the Pacific Coast States for 1930 show a decrease in the catch of fishery products and the value of the catch as compared with the previous year. This is due mainly to decreases in the volume of the catch of pilchards and salmon. The production of frozen fishery products was greater in 1930 than in 1929. The pack of cured fish decreased in 1930 as compared with the previous year. There was a decrease of 35 per cent in the pack of salmon in 1930 as compared with 1929, due to the smaller pack of humpback or pink salmon, as 1930 was the "off year" for these species. Compared with the pack in 1928, the previous "off year," there was an increase of 25 per cent in the pack. There was a decrease in the pack of sardines in 1930, but an increase of 34 per cent in the pack of tuna and tunalike fishes as compared with 1929. The landings of the halibut fleet in 1930 decreased somewhat from those in the previous year.

LAKE FISHERIES

The United States fisheries prosecuted in the Great Lakes and the International Lakes of northern Minnesota show an increase in the volume of the catch in 1930 as compared with the previous year, and a slight decrease in the value of the catch. A large increase in the catch of blue pike was responsible mainly for the increase in the catch. Beginning in 1929, a revised statistical procedure was used, incorporating the inclusion of certain products not canvassed in recent surveys, and a change in the methods of collecting statistics in some of the States. The catch of cisco, although much greater than in 1929, is still far below the volume once attained as an important product of the fisheries of Lake Erie. The production of cured fishery products increased as compared with 1929.

MISSISSIPPI RIVER AND TRIBUTARIES

No general survey of the fisheries of Mississippi region has been made since 1922, and therefore no recent trend can be determined. The yield of fresh-water mussels, which contributed approximately one-half to the total weight of the catch in 1922, shows an increase in 1930, not only over the production of 1922, but also that of 1929. The fisheries of Lake Pepin and Keokuk decreased in volume and value as compared with the previous year, but the catch and its value in the Mississippi River between these two lakes increased in 1930.

ALASKA

The catch of fishery products of Alaska in 1930 was somewhat less than during the previous year, and the value of the catch was considerably less. There was a decrease in the pack of salmon amounting to 6 per cent as compared with the pack in 1929. The catch of herring as well as that of halibut was somewhat less than in the previous year. There was an increase in the frozen fish and cured fish production over 1929.

Fisheries of the United States and Alaska, 1930 [1]

SUMMARY OF CATCH: BY SECTIONS

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Product	New England		Middle Atlantic		Chesapeake		South Atlantic and Gulf		Pacific	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Fish	645, 574	19, 232	131, 638	3, 588	199, 327	4, 391	301, 218	5, 278	806, 754	21, 303
Shellfish, etc	55, 777	8, 261	62, 230	9, 476	117, 066	7, 081	116, 541	5, 787	22, 790	1, 594
Whale products	--------	--------	--------	--------	--------	--------	--------	--------	3, 844	167
Total	701, 351	27, 493	193, 868	13, 064	316, 393	11, 472	417, 759	11, 065	833, 388	23, 064

Product	Lakes		Mississippi River and tributaries		Alaska		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Fish	89, 612	5, 875	53, 466	3, 310	609, 305	12, 178	2, 836, 894	75, 155
Shellfish, etc	5, 336	175	54, 705	1, 075	1, 980	108	436, 425	33, 557
Whale products	--------	--------	--------	--------	9, 417	470	13, 261	637
Total	94, 948	6, 050	108, 171	4, 385	620, 702	12, 756	3, 286, 580	109, 349

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[1] All figures are for 1930, except those for the Mississippi River and tributaries. In this section the figures on the catch of mussels are for 1930 and other figures are for 1922.

Fisheries of the United States and Alaska, 1930—Continued

OPERATING UNITS: BY SECTIONS

Item	New England	Middle Atlantic	Chesapeake	South Atlantic and Gulf [2]
	Number	*Number*	*Number*	*Number*
Fishermen:				
On vessels	6, 192	4, 665	2, 579	3, 454
On boats and shore	10, 885	5, 940	16, 812	20, 136
Total	17, 077	10, 605	19, 391	23, 590
Vessels:				
Steam	64	15	25	3
Net tonnage	9, 033	1, 940	2, 902	166
Motor	649	463	87	589
Net tonnage	18, 583	6, 998	1, 453	9, 255
Sail	5	97	279	78
Net tonnage	50	2, 306	3, 015	1, 224
Total vessels	718	575	391	670
Total net tonnage	27, 666	11, 244	7, 370	10, 645
Boats:				
Motor	4, 688	2, 014	8, 217	5, 950
Other	4, 099	2, 036	5, 603	8, 565
Apparatus:				
Haul seines	147	341	375	1, 211
Purse seines	185	37	49	78
Otter trawls (including all types and sizes)	565	180	12	2, 306
Gill nets	13, 524	3, 570	19, 989	18, 100
Trammel nets				449
Pound nets, trap nets, and weirs	542	758	2, 954	2, 399
Stop nets		87	6	
Fyke nets	258	4, 534	3, 472	3, 976
Bag nets and pocket nets	182			
Other nets [4]	235	359	2, 108	2, 420
Hooks, baits, or snoods	4, 686, 790	794, 602	1, 642, 961	358, 692
Fish wheels				50
Eel pots and traps	5, 045	10, 465	13, 292	1, 592
Lobster pots	332, 791	51, 946		
Crab and crawfish pots, traps, drags, etc	3, 530	58		3, 946
Clam dredges	84	82		73
Crab dredges		53	102	80
Mussel dredges		8		
Oyster dredges	300	674	966	720
Scallop dredges and drags	3, 522	1, 219	924	330
Crab scrapes			1, 850	
Tongs, rakes, hoes, forks, grabs, etc	4, 443	3, 230	11, 236	3, 836
Sponge apparatus				338
Other apparatus [6]	2, 442	259	18	2, 942

Item	Pacific	Lakes	Mississippi River and tributaries	Alaska	Total
	Number	*Number*	*Number*	*Number*	*Number*
Fishermen:					
On vessels	6, 165	1, 660		[3] 10, 189	34, 904
On boats and shore	13, 409	5, 320	12, 310		84, 812
Total	19, 574	6, 980	12, 310	10, 189	119, 716
Vessels:					
Steam	6	107		8	228
Net tonnage	182	2, 374		617	17, 214
Motor	849	360		682	3, 679
Net tonnage	21, 609	3, 726		11, 608	73, 232
Sail	8				467
Net tonnage	3, 140				9, 735
Total vessels	863	467		690	4, 374
Total net tonnage	24, 931	6, 100		12, 225	100, 181

[2] Includes the operating units used in the fisheries of Lake Okeechobee, Fla.

[3] Includes persons in boat and shore fisheries.

[4] Includes dip nets, cast nets, scap nets, reef nets, and other minor nets.

[6] Includes box traps, wire baskets, harpoons, spears, gaffs, crab and crawfish hooks, periwinkle and cockle pots, and other apparatus not included in "Other nets."

Fisheries of the United States and Alaska, 1930—Continued

OPERATING UNITS: BY SECTIONS—Continued

Item	Pacific	Lakes	Mississippi River and tributaries	Alaska	Total
Boats:	*Number*	*Number*	*Number*	*Number*	*Number*
Motor	5, 942	2, 215	4, 597	1, 814	35, 437
Other	1, 614	1, 664	10, 941	3, 439	37, 961
Apparatus:					
Haul seines	212	243	708	189	3, 426
Purse seines	395			703	1, 447
Lampara nets	241				241
Otter trawls (including all types and sizes)					3, 063
Beam trawls	55			9	64
Paranzella nets	16				16
Gill nets	5, 108	93, 542	866	5, 290	159, 989
Trammel nets	61	94	459		1, 063
Pound nets, trap nets, and weirs	670	7, 947	11	708	15, 989
Stop nets					93
Fyke nets	2, 102	2, 515	49, 652		66, 509
Bag nets and pocket nets	69				251
Other nets [4]	389	27			5, 538
Hooks, baits, or snoods	1, 196, 533	828, 571	(5)	(5)	9, 508, 149
Fish wheels	39			266	355
Eel pots and traps					30, 394
Lobster pots					384, 737
Shrimp nets and traps			4, 360		4, 360
Crab and crawfish pots, traps, drags, etc	18, 634	5, 418		620	32, 206
Clam dredges					239
Crab dredges					235
Mussel dredges					8
Oyster dredges					2, 660
Scallop dredges and drags					5, 995
Crab scrapes					1, 850
Tongs, rakes, hoes, forks, grabs, etc	3, 479	804	1, 810		28, 838
Crowfoot bars (pairs)		285	3, 490		3, 775
Abalone outfits	13				13
Sponge apparatus					338
Other apparatus [6]	4, 592		(5)		10, 253

CATCH: BY SECTIONS [7]

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England		Middle Atlantic		Chesapeake		South Atlantic and Gulf [8]		Pacific	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
FISH										
Alewives	4, 106	37	5, 292	36	21, 128	268	10, 207	74		
Amberjack							21	1		
Anchovies									320	4
Barracuda									4, 764	379
Black bass					19	3	440	47		
Bluefish	705	83	3, 814	393	498	42	2, 038	110		
Blue runner or hard-tail							756	14		
Bonito	140	11	417	27	49	3	20	(9)		
Bowfin							19	1		
Buffalofish							116	6		
Butterfish	1, 905	140	3, 137	237	4, 291	201	183	4		
Cabio or crab-eater					(9)	(9)	14	1		
Cabrilla									510	27
Carp	21	2	358	45	469	34	470	32	284	8

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[4] Includes dip nets, cast nets, scap nets, reef nets, and other minor nets.

[5] Number not determined.

[6] Includes box traps, wire baskets, harpoons, spears, gaffs, crab and crawfish hooks, periwinkle and cockle pots, and other apparatus not included in "Other nets."

[7] Salt fish have been converted to the basis of round weight.

[8] Includes the catch of fish taken in Lake Okeechobee, Fla.

[9] Less than 500 pounds or $500.

NOTE.—Whaling apparatus, the number of which was not determined, was used in the Pacific Coast States and Alaska.

Fisheries of the United States and Alaska, 1930—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England		Middle Atlantic		Chesapeake		South Atlantic and Gulf		Pacific	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
FISH—continued										
Catfish and bullheads	118	3	94	10	807	35	5,376	237	433	58
Cero			20	2			19	1		
Cigarfish							58	2		
Cod	101,632	3,043	10,679	335	50	1	1	(9)	19,236	302
Crappie							900	34		
Crevalle							103	3		
Croaker	151	6	2,890	87	22,022	525	5,270	82		
Cunner	106	3								
Cusk	6,140	133	8	(9)						
Dolly Varden trout									2	(9)
Dolphin	(9)	(9)	1	(9)			5	1		
Drum:										
Black			7	(9)	64	1	1,287	43		
Red or redfish			65	12	52	2	2,616	148		
Eels	1,355	132	1,272	147	389	34	159	12	(9)	(9)
Flounders	49,166	1,863	9,559	374	662	31	696	44	13,415	846
Flyingfish									48	2
Frigate mackerel	385	18								
Garfish							1	(9)		
Gizzard shad			1	(9)	168	4	39	1		
Goldfish					13	1				
Goosefish	(9)	(9)	38	1						
Grayfish	93	3	13	(9)					1,018	13
Groupers							3,346	101		
Grunts			(9)	(9)			48	2		
Haddock	264,549	8,531	2,574	77						
Hagfish			7	(9)						
Hake	32,206	557	366	6	1	(9)			56	1
Halfmoon									37	3
Halibut	3,167	497	5	1					13,546	1,631
Hardhead									39	5
Harvestfish or "starfish"					(9)	(9)	343	10		
Herring, sea	82,901	503	692	7					1,377	13
Hickory shad	4	(9)			90	3	387	17		
Hogfish							2	(9)		
Horse mackerel									369	11
Jewfish							44	1		
Kingfish (California)									457	11
Kingfish or "king mackerel"							3,689	175		
King whiting or "kingfish"	(9)	(9)	86	9	5	(9)	583	24		
Launce	183	4								
"Lingcod"									2,503	98
Mackerel	50,701	1,768	1,120	46	49	5			16,531	242
Menhaden	1,708	17	52,478	368	115,842	767	199,167	806		
Minnows	36	4	166	5						
Mojarro							81	3		
Mullet	8	(9)	65	4	115	5	28,021	910	21	2
Mummichog	7	1	126	9						
Muttonfish							225	15		
Paddlefish							2	(9)		
Permit							15	(9)		
Pigfish					69	3	157	3		
Pike or pickerel	(9)	(9)	1	(9)	11	2	10	1		
Pilchard									494,451	2,377
Pilotfish			2	(9)						
Pinfish							112	2		
Pollock	17,820	306	114	3						
Pompano					2	(9)	602	117	2	1
Porgies							56	2		
Porkfish							1	(9)		
Rock bass									508	32
Rockfishes									7,969	309
Rosefish	117	2	1	(9)						
Sablefish									4,332	182

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[9] Less than 500 pounds or $500.

Fisheries of the United States and Alaska, 1930—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England		Middle Atlantic		Chesapeake		South Atlantic and Gulf		Pacific	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
FISH—continued										
Salmon:										
Atlantic	88	27								
Blueback, red or sockeye									25, 103	2, 404
Chinook or king									37, 843	4, 153
Chum or keta									12, 668	117
Humpback or pink									272	8
Silver or coho									23, 729	1, 299
Sculpin									90	9
Scup	2, 723	118	8, 681	217	464	23				
Sea bass	192	14	3, 886	161	212	16	442	29	394	20
Sea bass, white (California)									1, 626	144
Sea robin	235	3	132	2	1	(9)				
Shad	201	16	450	82	7, 181	1, 139	2, 541	426	3, 043	82
Sharks	103	2	177	4			2, 497	5		
Sheepshead, salt-water							1, 077	41	244	9
Silversides			260	12						
Skates	1, 016	10	269	5	3	(9)	1	(9)	288	6
Skipper	6	1								
Smelt	796	141	3	1					3, 392	117
Snapper:										
Mangrove							125	5		
Red			4	(9)			7, 113	595		
Snook							408	14		
Spadefish							50	1		
Spanish mackerel			16	1	58	7	6, 355	311	43	2
Spearfish	(9)	(9)								
Split-tail									19	1
Spot			693	31	2, 619	132	2, 521	44		
Squawfish									5	(9)
Squeteagues or "sea trout":										
Gray	186	19	13, 272	466	19, 266	753	3, 396	142		
Spotted	1	(9)			202	24	5, 206	443		
Squirrelfish							1	(9)		
Steelhead trout									3, 954	331
Striped bass	89	17	205	40	1, 653	271	457	61	882	92
Sturgeon and sturgeon roe	9	1	22	9	5	1	32	6	142	6
Suckers	113	8	79	8			16	1	2	(9)
Sunfish			2	(9)			443	13		
Surf fishes									371	15
Swordfish	5, 135	876	234	38					563	75
Tautog	555	32	338	15	1	(9)				
Tenpounder							191	6		
Thimble-eyed mackerel			36	1						
Tilefish	1, 783	97	2, 312	89						
Tomcod	74	1	121	5	(9)	(9)			23	1
Tripletail							13	1		
Tuna and tunalike fishes:										
Albacore									286	24
Bluefin									21, 921	1, 238
Bonito									5, 164	167
Skipjack or striped									20, 486	790
Yellowfin									56, 654	3, 396
Horse mackerel	274	15	148	7						
Turbot							1	(9)		
Whitebait			96	7					179	12
Whitefish									225	13
White perch	50	5	380	56	616	41	442	33		
Whiting	9, 863	108	4, 113	70	27	1				
Wolffish	2, 651	54	6	(9)						

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[9] Less than 500 pounds or $500.

Fisheries of the United States and Alaska, 1930—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England		Middle Atlantic		Chesapeake		South Atlantic and Gulf		Pacific	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
FISH—continued										
Yellow perch	1	(9)	232	20	154	13	96	7		
Yellowtail			3	(9)			89	7	4,771	210
Miscellaneous fish									144	5
Total	645,574	19,232	131,638	3,588	199,327	4,391	301,218	5,278	806,754	21,303
SHELLFISH, ETC.										
Abalone									647	130
Clams:										
Cockle	29	5							30	10
Hard	3,822	858	2,577	1,055	1,294	432	1,042	89	515	38
Pismo									22	10
Razor	380	20	3	1					838	159
Soft	13,299	644	1,131	158					62	11
Surf	38	4	423	50						
Mixed									5	1
Conchs			35	3			20	(9)		
Crabs:										
Hard	1,952	129	417	29	60,565	1,072	6,493	105	4,540	399
King			6,184	29						
Rock			1	(9)						
Soft			135	22	8,194	650	531	117		
Stone							308	27		
Crawfish									177	18
Lobsters:										
Common	12,357	3,218	1,559	369						
Spiny							288	27	1,394	263
Mussels, sea	11	2	295	14					(9)	(9)
Octopus							4	(9)	163	11
Oysters:										
Eastern, market, public	46	11	342	45	21,648	2,569	13,341	835		
Eastern, market, private	9,386	1,736	21,175	4,032	15,076	1,783	5,243	581	75	31
Eastern, seed, public	1,362	168	19,773	2,520	8,235	417				
Eastern, seed, private	4,685	682	4,037	554						
Western, market									316	259
Japanese, market									228	83
Periwinkle	330	39								
Scallops:										
Bay	1,529	437	397	115	1,825	148	454	56	12	4
Sea	947	186	1,503	264						
Shrimp	5	4	341	29			88,117	2,995	2,785	49
Squid	5,506	112	1,773	55	225	8			10,980	118
Terrapin			6	7	2	2	67	21	(9)	(9)
Turtles			11	1	2	(9)	84	3	1	(9)
Irish moss	93	6								
Sponges							549	931		
Bloodworms			54	63						
Sandworms			58	61						
Total	55,777	8,261	62,230	9,476	117,066	7,081	116,541	5,787	22,790	1,594
WHALE PRODUCTS [10]										
Oil, whale									3,844	167
Total									3,844	167
Grand total	701,351	27,493	193,868	13,064	316,393	11,472	417,759	11,065	833,388	23,064

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[9] Less than 500 pounds or $500.

[10] The weight of whales caught was not determined; therefore, the weight of the manufactured product is shown.

Fisheries of the United States and Alaska, 1930—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Lakes		Mississippi River and tributaries		Alaska		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
FISH								
Alewives							40, 733	415
Amberjack							21	1
Anchovies							320	4
Barracuda							4, 764	379
Black bass			74	11			533	61
Bluefish							7, 055	628
Blue pike	11, 823	568					11, 823	568
Blue runner or hardtail							756	14
Bonito							626	41
Bowfin	19	(9)	190	6			228	7
Buffalofish	1	(9)	17, 267	1, 014			17, 384	1, 020
Butterfish							9, 516	582
Burbot	642	17					642	17
Cabio or crab-eater							14	1
Cabrilla							510	27
Carp	3, 293	106	18, 338	872			23, 233	1, 099
Catfish and bullheads	641	43	8, 093	714			15, 562	1, 100
Cero							39	3
Chubs	6, 162	469					6, 162	469
Cigarfish							58	2
Cisco	347	40					347	40
Cod					914	6	132, 512	3, 687
Crappie	4	1	512	49			1, 416	84
Crevalle							103	3
Croaker							30, 333	700
Cunner							106	3
Cusk							6, 148	133
Dolly Varden trout					92	9	94	9
Dolphin							6	1
Drum:								
Black							1, 358	44
Red or redfish							2, 733	162
Eels	5	(9)	16	1			3, 196	326
Flounders					327	8	73, 825	3, 166
Flyingfish							48	2
Frigate mackerel							385	18
Garfish							1	(9)
Gizzard shad							208	5
Goldeye	(9)	(9)					(9)	(9)
Goldfish	64	1					77	2
Goosefish							38	1
Grayfish							1, 124	16
Groupers							3, 346	101
Grunts							48	2
Haddock							267, 123	8, 608
Hagfish							7	(9)
Hake							32, 629	564
Halfmoon							37	3
Halibut					35, 063	2, 991	51, 781	5, 120
Hardhead							39	5
Harvestfish or "starfish"							343	10
Herring:								
Sea					145, 672	1, 093	230, 642	1, 616
Lake	22, 482	519					22, 482	519
Hickory shad							481	20
Hogfish							2	(9)
Horse mackerel							369	11
Jewfish							44	1
Kingfish (California)							457	11
Kingfish or "king mackerel"							3, 689	175
King whiting or "kingfish"							674	33
Lake trout	9, 497	1, 175					9, 497	1, 175
Launce							183	4
"Lingcod"					35	1	2, 538	99
Mackerel							68, 401	2, 061
Menhaden							369, 195	1, 958
Minnows	(9)	(9)					202	9
Mojarro							81	3
Mooneye	36	(9)	3	(9)			39	(9)

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[9] Less than 500 pounds or $500.

Fisheries of the United States and Alaska, 1930—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Lakes		Mississippi River and tributaries		Alaska		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
FISH—continued								
Mullet							28, 230	921
Mummichog							133	10
Muttonfish							225	15
Paddlefish			1, 411	162			1, 413	162
Permit							15	(9)
Pigfish							226	6
Pike or pickerel							22	3
Pike (jacks)	525	38	20	2			545	40
Pilchard							494, 451	2, 377
Pilotfish							2	(9)
Pinfish							112	2
Pollock							17, 934	309
Pompano							606	118
Porgies							56	2
Porkfish							1	(9)
Quillback			765	59			765	59
Rock bass	17	1	3	(9)			528	33
Rockfishes					9	(9)	7, 978	309
Rosefish							118	2
Sablefish					661	21	4, 993	203
Salmon:								
Atlantic							88	27
Blueback, red or sockeye					76, 339	2, 742	101, 442	5, 146
Chinook or king					17, 553	521	55, 396	4, 674
Chum or keta					59, 587	581	72, 255	698
Humpback or pink					241, 616	3, 404	241, 888	3, 412
Silver or coho					31, 347	793	55, 076	2, 092
Sauger pike	1, 831	95	5	1			1, 836	96
Sculpin							90	9
Scup							11, 868	358
Sea bass							5, 126	240
Sea bass, white (California)							1, 626	144
Sea robin							368	5
Shad							13, 416	1, 745
Sharks							2, 777	11
Sheepshead:								
Salt-water							1, 321	50
Fresh-water	2, 909	88	5, 261	290			8, 170	378
Silversides							260	12
Skates							1, 577	21
Skipper							6	1
Smelt	(9)	(9)			57	5	4, 248	264
Snapper:								
Mangrove							125	5
Red							7, 117	595
Snook							408	14
Spadefish							50	1
Spanish mackerel							6, 472	321
Spearfish							(9)	(9)
Splittail							19	1
Spot							5, 833	207
Squawfish							5	(9)
Squeteagues or "sea trout":								
Gray							36, 120	1, 380
Spotted							5, 409	467
Squirrelfish							1	(9)
Steelhead trout					33	3	3, 987	334
Striped bass							3, 286	481
Sturgeon and sturgeon roe	43	11	11	1			264	35
Sturgeon, shovelnose			229	23			229	23
Suckers	6, 746	186	700	63			7, 656	266
Sunfish	12	1	375	25			832	39
Surf fishes							371	15
Swordfish							5, 932	989
Tautog							894	47
Tenpounder							191	6
Thimble-eyed mackerel							36	1
Tilefish							4, 095	186
Tomcod							218	7
Tripletail							13	1
Tullibee	905	23					905	23

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[9] Less than 500 pounds or $500.

Fisheries of the United States and Alaska, 1930—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Lakes		Mississippi River and tributaries		Alaska		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
FISH—continued								
Tuna and tunalike fishes:								
Albacore							286	24
Bluefin							21, 921	1, 238
Bonito							5, 164	167
Skipjack or striped							20, 486	790
Yellowfin							56, 654	3, 396
Horse mackerel							422	22
Turbot							1	(9)
White bass	484	24	65	5			549	29
Whitebait							275	19
Whitefish	10, 172	1, 599					10, 397	1, 612
Whitefish, Menominee	372	25					372	25
White perch							1, 488	135
Whiting							14, 003	179
Wolffish							2, 657	54
Yellow bass			8	1			8	1
Yellow perch	6, 578	330	22	2			7, 083	372
Yellow pike	4, 002	515	25	4			4, 027	519
Yellowtail							4, 863	217
Miscellaneous fish			73	5			217	10
Total	89, 612	5, 875	53, 466	3, 310	609, 305	12, 178	2, 836, 894	75, 155
SHELLFISH, ETC.								
Abalone							647	130
Clams:								
Cockle							59	15
Hard							9, 250	2, 472
Pismo							22	10
Razor					853	48	2, 074	228
Soft							14, 492	813
Surf							461	54
Mixed							5	1
Conchs							55	3
Crabs:								
Hard					195	18	74, 162	1, 752
King							6, 184	29
Rock							1	(9)
Soft							8, 860	789
Stone							308	27
Crawfish	51	3	8	1			236	22
Lobsters:								
Common							13, 916	3, 587
Spiny							1, 682	290
Mussels, sea							306	16
Mussel shells	5, 285	160	54, 205	932			59, 490	1, 092
Octopus							167	11
Oysters:								
Eastern, market, public							35, 377	3, 460
Eastern, market, private							50, 955	8, 163
Eastern, seed, public							29, 370	3, 105
Eastern, seed, private							8, 722	1, 236
Western, market							316	259
Japanese, market							228	83
Periwinkle							330	39
Scallops:								
Bay							4, 217	760
Sea							2, 450	450
Shrimp			147	15	932	42	92, 327	3, 134
Squid							18, 484	293
Terrapin							75	30
Turtles			97	3			195	7
Frogs			232	20			232	20
Irish moss							93	6
Sponges							549	931
Bloodworms							54	63
Sandworms							58	61
Miscellaneous shellfish			16	3			16	3
Pearls and slugs		12		101				113
Total	5, 336	175	54, 705	1, 075	1, 980	108	436, 425	33, 557

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[9] Less than 500 pounds or $500.

Fisheries of the United States and Alaska, 1930—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Lakes		Mississippi River and tributaries		Alaska		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
WHALE PRODUCTS [10]								
Oil, sperm					909	41	909	46
Oil, whale					6, 125	37	9, 969	538
Whale meal and scrap					2, 340	51	2, 340	51
Other whale products					43	2	43	2
Total					9, 417	470	13, 261	637
Grand total	94, 948	6, 050	108, 171	4, 385	620, 702	12, 756	3, 286, 580	109, 349

CATCH: BY STATES

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

State	Marine and coastal rivers		Mississippi River and tributaries		Lakes [11]		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Alabama	7, 113	315	1, 921	42			9, 034	357
Arkansas			24, 964	744			24, 964	744
California	696, 891	12, 473					696, 891	12, 473
Connecticut	88, 012	4, 519					88, 012	4, 519
Delaware	51, 081	653					51, 081	653
Florida	117, 548	4, 529			2, 867	117	120, 415	4, 646
Georgia	34, 873	536					34, 873	536
Illinois			21, 713	996	1, 065	97	22, 778	1, 093
Indiana			6, 255	268	1, 160	81	7, 415	349
Iowa			7, 924	350			7, 924	350
Kansas			344	24			344	24
Kentucky			3, 920	185			3, 920	185
Louisiana	49, 886	1, 960	11, 850	603			61, 736	2, 563
Maine	143, 823	4, 330					143, 823	4, 330
Maryland	71, 098	3, 985					71, 098	3, 985
Massachusetts	442, 474	16, 289					442, 474	16, 289
Michigan			32	1	35, 579	2, 963	35, 611	2, 964
Minnesota			5, 056	211	11, 364	388	16, 420	599
Mississippi	15, 736	740	3, 855	203			19, 591	943
Missouri			1, 429	102			1, 429	102
Nebraska			135	15			135	15
New Hampshire	1, 069	69					1, 069	69
New Jersey	97, 276	7, 475					97, 276	7, 475
New York	45, 495	4, 934			1, 701	150	47, 196	5, 084
North Carolina	168, 938	1, 836					168, 938	1, 836
Ohio			1, 263	50	24, 115	1, 252	25, 378	1, 302
Oklahoma			318	31			318	31
Oregon	26, 459	2, 256					26, 459	2, 256
Pennsylvania	17	3		(12)	3, 419	279	3, 436	282
Rhode Island	25, 972	2, 287					25, 972	2, 287
South Carolina	5, 106	253					5, 106	253
South Dakota			321	8			321	8
Tennessee			9, 176	255			9, 176	255
Texas	15, 693	777	1, 030	34			16, 723	811
Virginia	245, 294	7, 487					245, 294	7, 487
Washington	110, 038	8, 335					110, 038	8, 335
West Virginia			45	7			45	7
Wisconsin			6, 620	256	16, 545	840	23, 165	1, 096
Alaska	620, 702	12, 756					620, 702	12, 756
Total	3, 080, 594	98, 797	108, 171	4, 385	97, 815	6, 167	3, 286, 580	109, 349

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[10] The weight of whales caught was not determined; therefore, the weight of the manufactured product is shown.

[11] Includes Lake Ontario, Lake Erie, Lake Huron, Lake Michigan, LakeSuperior, Rainy Lake, Namakan Lake, Lake of the Woods, Lake Okeechobee, and several mussel-bearing streams tributary to Lakes Huron and Michigan.

[12] Less than $500.

Yield of marine fisheries of the United States, 1930: By gear

Gear	New England		Middle Atlantic		Chesapeake	
	Pounds	Value	Pounds	Value	Pounds	Value
Purse seines	83, 344, 140	$1, 678, 805	58, 108, 240	$528, 657	115, 599, 007	$832, 726
Haul seines	4, 334, 554	123, 566	6, 156, 131	175, 977	5, 734, 552	326, 897
Gill nets	27, 051, 446	800, 404	4, 457, 543	304, 193	3, 066, 406	380, 319
Lines	136, 994, 604	4, 295, 936	14, 170, 459	643, 599	50, 569, 342	887, 771
Pound nets	15, 296, 727	323, 109	31, 458, 940	1, 173, 658	71, 477, 764	2, 659, 770
Floating traps	13, 313, 815	390, 587	356, 444	20, 864		
Weirs	32, 615, 387	183, 934	3, 974, 060	16, 243		
Stop nets			137, 008	18, 659	31, 800	3, 636
Fyke nets	209, 122	20, 201	3, 715, 253	110, 383	1, 336, 855	77, 044
Dip nets	6, 896, 327	91, 929	126, 332	21, 465	3, 359, 848	262, 185
Cast nets			8, 707	1, 279	24, 000	2, 520
Scap nets			92, 614	8, 693		
Bag nets	165, 213	22, 578				
Drag nets			146, 170	21, 473		
Push nets	70, 200	20, 550	23, 680	4, 856		
Pocket nets	1, 550	293				
Otter trawls	324, 670, 060	10, 456, 829	14, 754, 753	496, 143	1, 882, 747	86, 319
Traps	209, 825	7, 729				
Pots	15, 217, 939	3, 444, 182	3, 462, 348	492, 830	291, 860	25, 445
Harpoons	5, 241, 197	875, 957	234, 140	37, 887		
Spears	169, 124	19, 332	231, 117	29, 842	16, 600	1, 244
Scrapes, crab					7, 428, 389	426, 452
Dredges	18, 044, 906	3, 219, 820	46, 234, 785	7, 308, 141	17, 816, 643	1, 361, 773
Tongs	2, 436, 536	518, 414	3, 016, 720	843, 674	36, 782, 927	4, 002, 538
Rakes	1, 354, 593	330, 354	1, 550, 045	481, 311	866, 972	103, 687
Forks	11, 588, 903	499, 068	605, 460	199, 079		
Hoes	2, 097, 266	163, 683	327, 419	40, 921		
Picks					19, 432	7, 564
Gaffs			4, 350	784		
By hand	27, 545	6, 219	515, 263	83, 061	87, 780	24, 160
Total	701, 350, 979	27, 493, 479	193, 867, 981	13, 063, 672	316, 392, 924	11, 472, 050

Gear	South Atlantic and Gulf		Pacific		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Purse seines	198, 360, 548	$803, 822	248, 983, 923	$4, 595, 310	704, 395, 858	$8, 439, 320
Haul seines	26, 775, 958	1, 000, 661	5, 750, 111	508, 288	48, 751, 306	2. 135, 389
Gill nets	37, 867, 157	1, 645, 386	31, 501, 924	2, 710, 774	103, 944, 476	5, 841, 076
Trammel nets	5, 399, 327	317, 993	813, 607	87, 378	6, 212, 934	405, 374
Lines	24, 870, 957	1, 252, 261	156, 287, 360	8, 849, 242	382, 892, 722	15, 928, 808
Pound nets	12, 660, 693	302, 194	21, 047, 315	1, 740, 620	151, 941, 439	6, 199, 351
Floating traps					13, 670, 259	411, 459
Weirs	5, 000	250	437, 800	2, 579	37, 032, 247	203, 001
Wheels	141, 000	1, 725	280, 713	34, 086	421, 713	35, 811
Stop nets					168, 808	22, 296
Fyke nets	1, 156, 996	59, 917	471, 750	58, 374	6, 889, 976	325, 911
Dip nets	517, 829	32, 303	2, 628, 623	113, 652	13, 528, 959	521, 535
Cast nets	119, 083	6, 789			151, 790	10, 589
Scap nets					92, 614	8, 693
Bag nets			1, 296, 247	19, 444	1, 461, 460	42, 022
Drag nets			191, 501	12, 171	337, 671	33, 644
Push nets					93, 880	25, 406
Pocket nets					1, 550	293
Reef nets			5, 162	380	5, 162	380
Lampara nets			329, 089, 383	1, 769, 106	329, 089, 383	1, 769, 106
Paranzella nets			18, 926, 040	840, 980	18, 926, 040	840, 980
Otter trawls	87, 967, 911	2, 989, 583			429, 275, 471	14, 028, 874
Beam trawls			2, 054, 893	46, 447	2, 054, 893	46, 447
Traps	116, 073	6, 714	6, 504, 771	702, 072	6, 830, 669	716, 515
Pots	696, 426	53, 911			19, 668, 573	4, 016, 368
Harpoons			4, 379, 252	240, 810	9, 854, 589	1, 154, 654
Spears	172, 016	14, 964			588, 857	65, 382
Scrapes, crab					7, 428, 389	426, 452
Dredges	8, 815, 612	629, 309			90, 911, 946	12, 519, 043
Tongs	7, 209, 318	717, 623	[1] 2, 090, 894	602, 089	51, 536, 395	6, 684, 338
Rakes	438, 645	55, 573			4, 210, 255	970, 925
Forks	97, 928	7, 630			12, 292. 291	705, 777
Hoes					2, 424, 685	204, 604
Grabs	3, 111, 470	119, 863			3, 111, 470	119, 863
Picks					19, 432	7, 564
Gaffs					4, 350	784
Hooks	238, 418	220, 758			238, 418	220, 758
Diving apparatus, abalone or sponge	333, 583	710, 402	647, 316	130, 331	980, 899	840, 733
By hand	687, 518	115, 188	58	7	1, 318, 164	228, 635
Total	417, 759, 466	11, 064, 819	833, 388, 643	23, 064. 140	2, 462, 759, 993	86, 158, 160

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[1] Includes catch by rakes and shovels.

Industries related to the fisheries of the United States and Alaska, 1930 [1]

Item	New England	Middle Atlantic	Chesapeake	South Atlantic and Gulf	Pacific
Transporting:					
Persons engaged—					
On vessels	363	101	855	437	249
On boats	1	117		349	
Total	364	218	855	786	249
Vessels—					
Steam	3				1
Net tonnage	150				33
Motor	147	35	404	142	98
Net tonnage	1,835	525	5,273	1,418	2,250
Sail			24	43	
Net tonnage			737	409	
Total vessels	150	35	428	185	99
Total net tonnage	1,985	525	6,010	1,827	2,283
Boats	1	176		221	
Wholesale and manufacturing:					
Establishments	450	444	543	587	309
Persons engaged—					
Proprietors	364	531	812	726	385
Salaried employees	1,028	964	294	374	897
Wage earners:					
Average for season	9,862	4,254	10,569	13,535	10,554
Average for year	5,163	3,198	4,708	5,848	5,080
Salaries and wages paid	$8,455,460	$7,956,080	$2,976,346	$3,464,041	$8,636,995
Manufactured products [5]	$26,755,350	$15,421,325	$10,383,691	$12,320,405	$45,958,393
Fishermen's manufactured products:					
Persons engaged	4,147	592	531	1,011	(6)
Products	862,965	460,113	108,140	265,165	(6)

Item	Lakes	Mississippi River and tributaries	Alaska	Total
Transporting:				
Persons engaged—				
On vessels	76	27	1,926	4,034
On boats			(2)	467
Total	76	27	1,926	4,501
Vessels—				
Steam	6		20	30
Net tonnage	193		32,948	33,324
Motor	16	13	466	1,321
Net tonnage	249	214	14,927	26,691
Sail			1	68
Net tonnage			1,590	2,736
Total vessels	22	13	487	1,419
Total net tonnage	442	214	49,465	62,751
Boats			[3] 965	1,363
Wholesale and manufacturing:				
Establishments	228	174	260	2,995
Persons engaged—				
Proprietors	306	6,383	15,453	(4)
Salaried employees	375			(4)
Wage earners:				
Average for season	1,330			(4)
Average for year	1,102	(4)	(4)	(4)
Salaries and wages paid	$2,985,988	$4,639,877	(4)	(4)
Manufactured products [5]	$1,763,205	$3,804,914	$33,852,986	$150,260,269
Fishermen's manufactured products:				
Persons engaged	566	(6)	(6)	(6)
Products	257,033	(6)	(6)	(6)

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[1] Data for Mississippi River and tributaries are for 1922 with the exception of the number of establishments and value of manufactured products of the pearl button industry which are for 1930.

[2] Included on vessels.

[3] Includes scows, houseboats, pile drivers, etc.

[4] Detailed statistics not available.

[5] These production figures are not comparable with those shown in previous reports since packaged fresh and frozen fishery products of the marine and lakes sections are now included.

[6] Data not available.

MANUFACTURED FISHERY PRODUCTS TRADE

Statistics of the products of the various manufactured fishery enterprises were collected more completely for the year 1930 than for any previous year. It will be noted that in addition to statistics on the production of cured fishery products, canned fishery products, and by-products that the data presented herewith indicate the output of all packaged fishery products, including shucked oysters, crab meat, and the like.

This compilation includes the production throughout the marine and lake areas of the United States and Alaska, but does not include the manufactured products of the Mississippi River and tributaries.

Production of manufactured fishery products and by-products in the marine and lake sections of the United States and Alaska, 1930 [1]

Item	Quantity	Value
Alewives:		
Salted...pounds	12,623,595	$354,987
Corned...do	1,622,600	31,270
Spiced...do	157,500	13,800
Pickled...do	1,786,976	103,175
Smoked...do	298,231	13,758
Canned...standard cases	76,732	232,121
Roe, canned...do	56,874	286,604
Dry scrap...tons	1,010	46,254
Oil...gallons	33,889	7,173
Barracuda, fresh fillets...pounds	225,000	43,500
Blue pike:		
Fresh fillets...do	618,301	127,490
Frozen fillets...do	145,250	29,050
Buffalofish, smoked...do	743,952	312,493
Butterfish:		
Pandressed...do	63,986	7,610
Smoked...do	650,848	197,655
Cabrilla, fresh fillets...do	115,000	20,250
Carp, smoked...do	106,500	31,750
Cisco, chubs, and tullibee, smoked...do	8,272,227	2,323,455
Cod:		
Fresh sticks...do	280,390	49,486
Fresh fillets...do	5,642,605	843,373
Frozen fillets...do	1,609,928	215,320
Salted bits...do	21,627	1,808
Salted, including boneless salted...do	15,617,613	1,044,561
Salted, packaged...do	2,812,077	[2] 412,740
Stockfish...do	15,600	2,090
Pickled...do	120,135	5,665
Smoked fillets...do	638,022	94,981
Cakes, balls, etc., canned...standard cases	28,224	259,659
Oil, cod and cod-liver...gallons	135,884	102,857
Croaker:		
Pandressed...pounds	858,705	83,926
Fresh fillets...do	28,400	3,473
Cusk:		
Fresh sticks...do	150,490	25,732
Fresh fillets...do	340,680	53,507
Frozen fillets...do	17,460	1,971
Salted...do	508,408	22,933
Smoked fillets...do	869,635	122,649
Eels:		
Salted...do	63,400	6,340
Smoked...do	77,682	28,160
Flounders:		
Pandressed...do	85,565	10,032
Fresh fillets...do	6,208,203	1,240,236
Frozen fillets...do	359,809	61,712
Groupers, fresh steaks...do	107,000	19,220

[1] The figures in the above table do not check in all instances with figures on certain manufactured products shown in the report for 1930. This is due to the fact that the above figures were obtained as the result of a more detailed survey, and several firms' production is included which is not shown in the previous report. The figures herewith include the production of every primary firm in the marine and lakes sections of the United States and Alaska manufacturing fishery products or by-products as shown above which operated in 1930 to the knowledge of the bureau.

[2] The item of 2,812,077 pounds of salted packaged cod, valued at $412,740, is included in the total, however, it should be explained that this item represents a further manufacture of salted cod which is shown elsewhere in the table.

Production of manufactured fishery products and by-products in the marine and lake sections of the United States and Alaska, 1930—Continued

Item	Quantity	Value
Haddock:		
Pandressed ... pounds	38, 590	$5, 789
Fresh sticks ... do	183, 470	31, 564
Fresh fillets ... do	44, 189, 952	6, 980, 307
Frozen fillets ... do	19, 511, 707	3, 017, 548
Salted ... do	679, 499	39, 034
Finnan haddie ... do	5, 098, 811	478, 303
Finnan haddie, canned ... standard cases	1, 002	15, 339
Smoked fillets ... pounds	1, 035, 443	191, 654
Flakes, canned ... standard cases	62, 067	614, 475
Hake:		
Sticks, fresh and frozen ... pounds	214, 060	35, 099
Fresh fillets ... do	2, 195, 512	284, 188
Frozen fillets ... do	439, 102	58, 200
Salted ... do	5, 006, 869	173, 998
Smoked fillets ... do	55, 602	6, 178
Halibut:		
Fresh fillets ... do	46, 472	16, 217
Frozen fillets ... do	10, 859	2, 810
Steaks ... do	89, 938	15, 105
Salted ... do	5, 220	649
Herring, sea:		
Salted, including Scotch-cured ... do	8, 722, 670	500, 772
Roused ... do	352, 500	15, 045
Norwegian cure ... do	145, 375	9, 156
Spiced and Bismark ... do	76, 100	7, 766
Kippered ... do	198, 163	43, 715
Smoked—		
Bloaters ... do	2, 850, 862	270, 692
Boneless ... do	1, 387, 750	149, 283
Lengthwise ... do	127, 794	12, 780
Medium scaled ... do	265, 088	26, 263
Miscellaneous ... do	730, 959	105, 517
Canned, "sardines" ... standard cases	1, 399, 212	4, 459, 071
Pomace ... tons	3, 736	7, 592
Meal ... do	13, 831	732, 963
Oil ... gallons	3, 670, 664	908, 359
Scales ... pounds	81, 153	1, 932
Herring, lake:		
Salted ... do	8, 082, 003	248, 851
Spiced ... do	95, 000	13, 350
Smoked, including smoked fillets ... do	637, 440	66, 670
Lake trout:		
Salted ... do	201, 950	29, 571
Smoked ... do	472, 413	132, 369
Mackerel:		
Fresh and frozen fillets ... do	178, 432	37, 453
Salted ... do	2, 410, 532	197, 140
Salted, fillets and split ... do	2, 184, 364	247, 356
Smoked ... do	328, 571	65, 718
Canned ... standard cases	132, 262	467, 885
Menhaden:		
Acid scrap ... tons	15, 725	395, 295
Dry scrap ... do	23, 235	1, 113, 201
Meal ... do	9, 752	514, 717
Oil ... gallons	3, 311, 215	654, 195
Mullet:		
Salted and dry-salted ... pounds	2, 071, 289	128, 011
Roe, salted ... do	75, 184	19, 295
Pilchard or sardines:		
Salted ... do	65, 490	3, 472
Canned ... standard cases	2, 979, 333	8, 741, 928
Meal ... tons	25, 938	1, 414, 858
Oil ... gallons	5, 803, 166	1, 826, 319
Pollock:		
Fresh fillets ... pounds	277, 714	36, 298
Frozen fillets ... do	25, 773	3, 594
Salted ... do	3, 133, 905	171, 113
Rockfishes, fresh fillets ... do	761, 500	120, 400
Sablefish:		
Salted ... do	176, 009	12, 107
Pickled ... do	10, 800	540
Smoked ... do	333, 477	75, 782
Salmon:		
Steaks ... do	34, 917	5, 565
Dried ... do	1, 593, 600	115, 585
Mild-cured ... do	10, 157, 175	2, 065, 553
Salted ... do	189, 546	24, 684
Pickled ... do	863, 150	103, 661
Kippered ... do	2, 672, 214	[3] 594, 547

[3] An item of 300,000 pounds of kippered salmon valued at $115,000, and an item of 6,844,175 pounds of smoked salmon, valued at $2,665,881, are included in the total; however, it should be explained that these items represent a further manufacture of mild-cured salmon which is shown elsewhere in the table.

Production of manufactured fishery products and by-products in the marine and lake sections of the United States and Alaska, 1930—Continued

Item	Quantity	Value
Salmon—Continued.		
Smoked ... pounds	7,660,931	[3] $2,935,420
Canned ... standard cases	6,086,479	42,828,172
Meal ... tons	2,487	136,745
Oil ... gallons	233,941	53,778
Eggs—		
For food, canned ... standard cases	1,667	15,683
For bait, canned ... do	4,345	103,753
Sea bass, black, fresh fillets ... pounds	55,500	7,825
Sea bass, white, fresh fillets ... do	326,250	79,375
Shad:		
Smoked ... do	169,784	[4] 38,020
Canned ... standard cases	12,248	42,190
Roe, canned ... do	3,339	69,579
Shark oil ... gallons	4,460	1,190
Spanish mackerel, dry-salted ... pounds	75,421	5,714
Spot:		
Pandressed ... do	34,445	4,451
Salted and dry-salted ... do	172,000	10,220
Squeteague:		
Pandressed ... do	802,309	85,014
Fresh fillets ... do	233,935	37,410
Sun-dried ... do	27,717	8,316
Sturgeon:		
Smoked ... do	2,060,699	1,592,277
Roe—		
Fresh ... do	182	164
Salted ... do	740	741
Caviar, canned ... standard cases	8,024	1,004,820
Totuava, fillets ... pounds	260,000	52,000
Tuna and tunalike fishes:		
Salted bonito ... do	18,134	1,567
Canned ... standard cases	2,010,640	13,055,876
Meal ... tons	8,554	428,556
Oil ... gallons	56,748	14,153
Whales:		
Pickled meat ... pounds	37,000	1,850
Meal ... tons	1,170	51,400
Bone ... pounds	5,600	308
Oil—		
Whale ... gallons	1,325,229	536,904
Sperm ... do	128,027	48,009
Whitefish:		
Salted ... pounds	112,523	8,221
Smoked ... do	661,759	221,385
Caviar ... do	950	476
Caviar, canned ... standard cases	866	26,804
Whiting, pandressed ... pounds	88,445	6,023
Wolffish:		
Fresh fillets ... do	19,812	3,719
Frozen fillets ... do	37,737	5,280
Yellow perch, fresh fillets ... do	180,224	38,706
Crab meat:		
Packaged, fresh cooked ... do	5,573,474	1,783,498
Canned ... standard cases	1,596	57,810
King crab, scrap ... tons	636	24,961
Lobster meat, packaged, fresh cooked ... pounds	103,716	129,488
Spiny lobster, whole, cooked ... do	1,064,250	287,693
Shrimp:		
Headless, packaged—		
Fresh ... do	1,123,129	287,282
Frozen ... do	1,485,387	266,878
Cooked, fresh ... do	330,645	103,844
Canned ... standard cases	826,242	5,013,337
Sun-dried ... pounds	1,740,329	368,684
Meal ... tons	2,386	74,287
Abalone, steaks ... pounds	583,589	248,025
Clams, hard:		
Fresh-shucked ... gallons	27,931	61,615
Canned—		
Whole ... standard cases	28,502	164,883
Chowder ... do	254,449	1,011,499
Minced ... do	4,476	29,583
Cocktail juice and broth ... do	12,945	98,793

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[4] An item of 16,050 pounds of smoked shad, valued at $4,182, is included in the total; however, it should be explained that this item represents a further manufacture of mild-cured shad which is included elsewhere in the table.

Production of manufactured fishery products and by-products in the marine and lake sections of the United States and Alaska, 1930—Continued

Item	Quantity	Value
Clams, razor, canned:		
Whole...standard cases	5, 793	$50, 157
Chowder...do	640	1, 600
Minced...do	67, 533	612, 754
Juice...do	566	2, 311
Clams, soft:		
Fresh shucked...gallons	189, 577	232, 079
Canned—		
Whole...standard cases	95, 203	419, 636
Chowder...do	71, 240	209, 989
Juice and broth...do	16, 388	54, 782
Marine-shell products:		
Blanks...gross	721, 346	336, 628
Buttons...do	4, 286, 617	3, 651, 983
Novelties		776, 334
Mussels, fresh-water:		
Shells—		
Blanks...gross	176, 740	36, 812
Buttons...do	1, 023, 618	369, 705
Novelties		75
Oysters:		
Eastern—		
Fresh-shucked...gallons	5, 435, 368	9, 937, 898
Canned...standard cases	403, 981	1, 871, 894
Japanese, fresh-shucked...gallons	27, 950	97, 825
Western, fresh-shucked...do	39, 405	311, 125
Shell products—		
Poultry feed...tons	279, 470	2, 316, 576
Lime...do	58, 113	194, 444
Lime, "burned"...do	9, 847	89, 290
Scallops, bay, fresh-shucked...gallons	463, 863	821, 574
Scallops, sea, fresh-shucked...do	272, 153	502, 229
Squid, dried...pounds	1, 383, 660	55, 346
Turtle meat and soup, canned...standard cases	4, 663	94, 889
Terrapin meat and stew, canned...do	96	8, 003
Unclassified products:		
Fillets and steaks [5]...pounds	737, 796	89, 806
Miscellaneous packaged [6]...do	172, 230	29, 603
Salted—		
Cheeks and tongues...do	12, 858	1, 016
Other [7]...do	509, 503	40, 661
Pickled and spiced [8]...do	163, 313	30, 653
Smoked [9]...do	189, 900	46, 389
Canned—		
Fish for cat and dog food...standard cases	16, 587	50, 460
Other [10]...do	131, 492	1, 028, 716
Dry scrap...tons	893	39, 767
Meal [11]...do	16, 660	1, 026, 191
Oil—		
Tanner's...gallons	40, 618	19, 137
Miscellaneous [12]...do	72, 445	21, 573
Glue...do	524, 082	1, 240, 558
Other by-products [13]		344, 777
Total fresh and frozen packaged products...pounds	157, 378, 368	28, 996, 454
Total cured products...do	124, 496, 656	16, 837, 406
Total canned products...do	577, 782, 585	83, 015, 055
Total by-products		19, 559, 856
Grand total		148, 408, 771

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[5] Includes amberjack, bluefish, butterfish, grouper, lake trout, mullet, jack pike, red snapper, salmon sauger pike, shad, snook, Spanish mackerel, whitefish, and whiting fillets; amberjack, "lingcod," red snapper and rockfish steaks; and red snapper and whiting sticks.

[6] Includes fresh alewife roe, pandressed bluefish; cisco caviar; packaged fish cakes; fresh-shucked conchs; and frozen packaged scallops.

[7] Includes salted anchovies, barracuda, bluefish, cabrilla, ciscoes, black and white sea bass, shad and yellowtail; corned shad; and mild-cured shad.

[8] Includes spiced carp; pickled lake herring, sea herring, lake trout, and Dolly Varden trout.

[9] Includes smoked flounders, pilchard, sablefish, and salmon fillets.

[10] Includes canned smoked eels, fish cakes, etc., haddock fillets, creamed fish, smoked sea herring, spiced and soused salmon, salmon roe, smoked sturgeon, shrimp gumbo soup, abalone, clam cakes, pickled mussels, squid, herring for bait, and miscellaneous fish eggs for food.

[11] Includes meal from mackerel, king crabs, clams, kelp, and mixed species.

[12] Includes oil from blackfish, mackerel, shark livers, and mixed species.

[13] Includes agar-agar; alginates, crab scrap, fish flour, isinglass, menhaden for bait, poultry feed and lime from fresh-water mussel shells, sea herring skins, and shark fins, meat, skins, and teeth.

CANNED FISHERY PRODUCTS AND BY-PRODUCTS TRADE

The output of canned fishery products and by-products in the United States and Alaska in 1931 was valued at $79,513,846. Of the total, canned products comprised $62,948,791 and by-products $16,565,055, a decrease of 24 per cent in the value of canned products and 30 per cent in the value of by-products when compared with the respective values of the same groups for the previous year.

Fishery products were canned at 412 establishments in the United States and Alaska during 1931. The combined output of these canneries amounted to 12,580,826 standard cases. The net weight of the products canned amounted to 506,414,020 pounds.

Canned fishery products or by-products were prepared in 27 States and Alaska during 1931. Alaska ranked first in the value of these products, accounting for 38 per cent of the total; California ranked second with 19 per cent of the total; and Washington ranked third with 9 per cent.

Canned fishery products and by-products of the United States and Alaska, 1931

SUMMARY OF PRODUCTION: BY COMMODITIES

Product	Number of plants	Standard cases	Pounds	Value
Canned products:				
Salmon—				
United States	50	1, 336, 234	64, 139, 232	$8, 986, 308
Alaska	116	5, 403, 811	259, 382, 928	29, 096, 868
Sardines—				
Maine	27	885, 408	22, 135, 200	2, 647, 187
California	22	1, 713, 407	82, 243, 536	4, 715, 089
Tuna and tunalike fishes	15	1, 216, 976	29, 207, 424	7, 279, 392
Alewives	16	34, 620	1, 661, 760	78, 973
Alewife roe	31	32, 740	1, 571, 520	132, 073
Shad	4	747	35, 856	2, 091
Shad roe	9	2, 100	100, 800	63, 060
Mackerel	8	102, 392	4, 914, 816	246, 848
Fish flakes	5	28, 486	1, 367, 328	514, 553
Fish cakes, balls, etc	7	103, 704	4, 977, 792	779, 411
Cat and dog food	4	52, 509	2, 520, 432	143, 345
Salmon roe and caviar	5	3, 360	161, 280	30, 486
Sturgeon caviar	8	4, 630	222, 240	609, 502
Whitefish roe and caviar	6	829	39, 792	23, 498
Salmon eggs (for bait)	10	5, 246	251, 808	149, 186
Miscellaneous fish, roe, and caviar	10	9, 391	450, 768	77, 870
Oysters	43	306, 278	4, 594, 170	963, 525
Shrimp	55	821, 375	13, 758, 649	3, 982, 247
Clam products	61	500, 040	[1] 11, 882, 625	2, 256, 909
Crabs	5	646	31, 008	12, 817
Turtle products	3	4, 058	194, 784	74, 945
Miscellaneous shellfish	6	11, 839	568, 272	82, 608
Total	[2] 412	12, 580, 826	506, 414, 020	62, 948, 791
			Quality	Value
By-products:				
Oyster-shell products ____ tons			306, 229	$1, 992, 024
Fresh-water mussel-shell products				4, 970, 240
Marine pearl-shell products				3, 552, 903
Scrap, meal, etc ____ tons			84, 183	2, 986, 395
Marine-animal oils ____ gallons			8, 565, 651	1, 619, 936
Miscellaneous by-products				1, 443, 557
Total				16, 565, 055
Grand total				79, 513, 846

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[1] "Cut out" or "Drained" weights of can contents are included for whole and minced clams, and gross can contents for chowder, bouillon, broth, juice, and cocktail.

[2] Exclusive of duplication.

Canned fishery products and by-products of the United States and Alaska, 1931—Continued

VALUE OF PRODUCTION: BY STATES

State	Canned products	By-products[3]	Total
Maine	$3, 580, 321	$219, 647	$3, 799, 968
Massachusetts and Rhode Island	1, 134, 691	1, 650, 629	2, 785, 320
Connecticut	---	992, 744	992, 744
New York and New Jersey	1, 345, 155	2, 826, 450	4, 171, 605
Pennsylvania	---	572, 905	572, 905
Delaware	---	96, 155	96, 155
Maryland	77, 831	695, 692	773, 523
Virginia	129, 551	939, 218	1, 068, 769
North Carolina	22, 439	152, 443	174, 882
South Carolina	293, 688	75, 604	369, 292
Georgia and Florida	937, 312	441, 099	1, 378, 411
Alabama	270, 886	47, 456	318, 342
Mississippi	1, 283, 437	225, 200	1, 508, 637
Louisiana	1, 863, 897	683, 945	2, 547, 842
Texas, Utah, and Wisconsin	458, 756	157, 249	616, 005
Missouri, Illinois, and Kentucky	---	75, 988	75, 988
Iowa	---	3, 583, 013	3, 583, 013
Washington	6, 752, 088	133, 035	6, 885, 123
Oregon	2, 858, 046	15, 170	2, 873, 216
California	12, 529, 384	2, 290, 600	14, 819, 984
Alaska	29, 411, 309	690, 813	30, 102, 122
Total	62, 948, 791	16, 565, 055	79, 513, 846

[3] Including menhaden, fresh-water mussel-shell, and marine pearl-shell products.

Pack of canned salmon, Pacific Coast States and Alaska, 1931, standard cases

Product	Alaska							
	Southeast		Central		Western		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
Chinook or king:								
1-pound tall	7, 093	$46, 476	9, 126	$65, 671	5, 719	$39, 597	21, 938	$151, 744
1-pound flat	3, 155	33, 216	10, 722	117, 342	2, 844	28, 185	16, 721	178, 743
½-pound flat	4, 648	55, 133	7, 751	93, 677	809	8, 090	13, 208	156, 900
Total	14, 896	134, 825	27, 599	276, 690	9, 372	75, 872	51, 867	487, 387
Blueback, red or sockeye:								
1-pound tall	116, 327	1, 074, 133	383, 495	3, 471, 793	1, 095, 276	9, 859, 166	1, 595, 098	14, 405, 092
1-pound flat	17, 972	179, 720	19, 175	186, 951	3, 855	38, 210	41, 002	404, 881
½-pound flat	13, 596	217, 725	36, 483	458, 175	8, 099	100, 215	58, 178	776, 115
Total	147, 895	1, 471, 578	439, 153	4, 116, 919	1, 107, 230	9, 997, 591	1, 694, 278	15, 586, 088
Silver or coho:								
1-pound tall	77, 885	506, 653	79, 037	471, 763	92	556	157, 014	978, 972
1-pound flat	2, 663	20, 239	239	1, 670	---	---	2, 902	21, 909
½-pound flat	7, 907	89, 649	2, 055	16, 104	---	---	9, 962	105, 753
Total	88, 455	616, 541	81, 331	489, 537	92	556	169, 878	1, 106, 634
Humpback or pink:								
1-pound tall	1, 967, 051	6, 797, 186	935, 875	3, 141, 778	---	---	2, 902, 926	9, 938, 964
1-pound flat	2, 242	8, 849	2, 168	7, 805	---	---	4, 410	16, 654
½-pound flat	44, 149	246, 768	2, 375	13, 112	---	---	46, 524	259, 880
Total	2, 013, 442	7, 052, 803	940, 418	3, 162, 695	---	---	2, 953, 860	10, 215, 498
Chum or keta:								
1-pound tall	270, 256	870, 630	192, 768	606, 056	66, 555	202, 202	529, 579	1, 678, 888
1-pound flat	---	---	35	140	---	---	35	140
½-pound flat	3, 992	20, 745	250	912	---	---	4, 242	21, 657
Total	274, 248	891, 375	193, 053	607, 108	66, 555	202, 202	533, 856	1, 700, 685
Steelhead: 1-pound tall	72	576	---	---	---	---	72	576
Grand total	2, 539, 008	10, 167, 698	1, 681, 554	8, 652, 949	1, 183, 249	10, 276, 221	5, 403, 811	29, 096, 868

Pack of canned salmon, Pacific Coast States and Alaska, 1931, standard cases—Con.

Product	United States						Grand total, Alaska and United States	
	Washington		Oregon and California		Total			
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
Chinook or king:								
1-pound tall	27, 471	$169, 084	16, 005	$62, 358	43, 476	$231, 442	65, 414	$383, 186
1-pound oval	960	19, 200	2, 086	42, 063	3, 046	61, 263	3, 046	61, 263
1-pound flat	18, 817	230, 015	87, 672	851, 347	106, 489	1, 081, 362	123, 210	1, 260, 105
½-pound oval	87	2, 001	759	17, 457	846	19, 458	846	19, 458
½-pound flat	65, 073	876, 776	109, 047	1, 421, 569	174, 120	2, 298, 345	187, 328	2, 455, 245
¼-pound flat			1, 158	30, 762	1, 158	30, 762	1, 158	30, 762
Total	112, 408	1, 297, 076	216, 727	2, 425, 556	329, 135	3, 722, 632	381, 002	4, 210, 019
Blueback, red or sockeye:								
1-pound tall	1, 803	17, 128			1, 803	17, 128	1, 596, 901	14, 422, 220
1-pound flat	4, 629	60, 177			4, 629	60, 177	45, 631	465, 058
½-pound flat	87, 282	1, 346, 238	2, 245	35, 920	89, 527	1, 382, 158	147, 705	2, 158, 273
Total	93, 714	1, 423, 543	2, 245	35, 920	95, 959	1, 459, 463	1, 790, 237	17, 045, 551
Silver or coho:								
1-pound tall	46, 915	333, 069	2, 012	12, 474	48, 927	345, 543	205, 941	1, 324, 515
1-pound flat	21, 032	159, 748	14, 801	112, 488	35, 833	272, 236	38, 735	294, 145
½-pound flat	14, 839	135, 593	7, 612	66, 986	22, 451	202, 579	32, 413	308, 332
¼-pound oval	67	1, 206			67	1, 206	67	1, 206
¼-pound flat	2, 151	27, 963	5, 072	65, 936	7, 223	93, 899	7, 223	93, 899
Total	85, 004	657, 579	29, 497	257, 884	114, 501	915, 463	284, 379	2, 022, 097
Humpback or pink:								
1-pound tall	663, 698	2, 256, 573			663, 698	2, 256, 573	3, 566, 624	12, 195, 537
1-pound flat	2, 887	10, 393			2, 887	10, 393	7, 297	27, 047
½-pound flat	38, 943	218, 081			38, 943	218, 081	85, 467	477, 961
Total	705, 528	2, 485, 047			705, 528	2, 485, 047	3, 659, 388	12, 700, 545
Chum or keta:								
1-pound tall	67, 152	212, 549	11, 463	34, 575	78, 615	247, 124	608, 194	1, 926, 012
1-pound flat							35	140
½-pound flat	199	995			199	995	4, 441	22, 652
Total	67, 351	213, 544	11, 463	34, 575	78, 814	248, 119	612, 670	1, 948, 804
Steelhead:								
1-pound tall	80	480			80	480	152	1, 056
1-pound flat	1, 438	10, 066	1, 479	10, 353	2, 917	20, 419	2, 917	20, 419
½-pound oval	1, 766	30, 375	3, 093	53, 200	4, 859	83, 575	4, 859	83, 575
½-pound flat	1, 392	15, 312	2, 782	30, 602	4, 174	45, 914	4, 174	45, 914
¼-pound oval			130	2, 730	130	2, 730	130	2, 730
¼-pound flat	62	1, 116	75	1, 350	137	2, 466	137	2, 466
Total	4, 738	57, 349	7, 559	98, 235	12, 297	155, 584	12, 369	156, 160
Grand total	1, 068, 743	6, 134, 138	267, 491	2, 852, 170	1, 336, 234	8, 986, 308	6, 740, 045	38, 083, 176

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of 1-pound cans, 48 to the case. Salmon were canned at 34 plants in Washington, 11 in Oregon, 5 in California, and 116 in Alaska.

Pack of canned sardines, 1931

Sardine (herring)	Maine	
	Cases	Value
Quarters, ¼-pound (100 cans):		
In olive oil	1, 771	$10, 802
In cottonseed oil	789, 499	2, 386, 728
In mustard	39, 154	138, 044
In tomato sauce	4, 224	15, 736
Three-quarters, ¾-pound (48 cans): In mustard	35, 250	95, 877
Total	869, 898	2, 647, 187
Total (standard cases)	885, 408	

Sardine (pilchard)	California	
	Cases	Value
½-pound oval (48 cans):		
In tomato sauce	22, 440	$53, 285
In other sauces or oils	771	7, 479
1-pound oval (48 cans):		
In tomato sauce	1, 330, 257	3, 536, 204
In cottonseed oil	13, 756	38, 524
In mustard	111, 683	293, 964
In natural oil	28, 441	72, 971
In other sauces or oils	9, 284	22, 226
¼-pound square (100 cans):		
In various sauces or oils	1, 656	13, 646
5-ounce (100 cans):		
In natural oil	125, 821	353, 635
In other sauces or oils	4, 024	11, 267
6-ounce (100 cans): In miscellaneous sauces or oils	29, 967	79, 778
1-pound tall (48 cans):		
In natural oil	85, 758	200, 840
In other sauces or oils	12, 360	27, 495
Other sizes, various sauces or oils (standard cases)	1, 460	3, 775
Total	1, 777, 678	4, 715, 089
Total (standard cases)	1, 713, 407	

NOTE.—"Standard cases" represent the various sized cases converted to the uniform basis of ¼-pound cans, 100 to case, of sardines (herring), and 1-pound cans, 48 to the case, of sardines (pilchard). Sardines were canned at 27 plants in Maine and 22 in California.

Pack of canned tuna and tunalike fishes in California, 1931

Size	Albacore		Yellowfin		Bluefin		Striped	
	Cases	Value	Cases	Value	Cases	Value	Cases	Value
¼-pound (48 cans)	[1] 9, 813	$50, 666	106, 530	$456, 764	1, 231	$3, 770	26, 979	$95, 411
¼-pound (100 cans)			10, 227	76, 096	9, 920	72, 176	9, 497	65, 989
½-pound (48 cans)	111, 900	798, 206	427, 389	2, 703, 344	23, 145	121, 487	173, 043	863. 546
1-pound (48 cans)	[2] 14, 506	193, 268	[2] 51, 773	582, 206	[2] 3, 855	34, 894	14, 528	119, 431
Flakes (standard cases)	11, 840	53, 525	56, 671	236, 151	5, 092	20, 596	12, 043	48, 945
Total	148, 059	1, 095, 665	652, 590	4, 054, 561	43, 243	252, 923	236, 090	1, 193, 322
Total (standard cases)	157, 658		651, 523		46, 895		237, 524	

Size	"Tonno"		Bonito		Yellowtail		Total	
	Cases	Value	Cases	Value	Cases	Value	Cases	Value
¼-pound (48 cans)			222	$610			144, 775	$607, 221
¼-pound (100 cans)	56, 259	$381, 858	14, 520	96, 021	354	$1, 947	100, 777	694, 087
½-pound (48 cans)	[3] 8, 087	53, 129	14, 332	59, 288	408	1, 684	758, 304	4, 600, 684
1-pound (48 cans)			11, 201	74, 349	1, 241	9, 237	97, 104	1, 013, 385
Flakes (standard cases)			1, 423	4, 665	38	133	87, 107	364, 015
Total	64, 346	434, 987	41, 698	234, 933	2, 041	13, 001	1, 188, 067	7, 279, 392
Total (standard cases)	66, 687		53, 392		3, 297		1, 216, 976	

[1] Includes the pack in ⅛-pound jars, 96 to the case and 7-ounce jars, 24 to the case, which have been converted to the equivalent of ¼-pound cans, 48 to the case.

[2] Includes the pack in 4-pound cans, 12 to the case, which have been converted to the equivalent of 1-pound cans, 48 to the case.

[3] Includes the pack in ½-pound cans, 50 the case, which have been converted to the equivalent of ½-pound cans, 48 to the case.

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of forty-eight ½-pound cans to the case. Tuna and tunalike fishes were canned in 15 plants in California.

Pack of canned alewives and alewife roe, 1931

STANDARD CASES

Product	Maryland		Virginia		North Carolina		Total	
	Cases	Value	Cases	Value	Cases	Value	Cases	Value
Alewives	17, 650	$41, 155	16, 970	$37, 818			34, 620	$78, 973
Alewife roe	7, 896	35, 416	21, 270	83, 264	3, 574	$13, 393	32, 740	132, 073
Total	25, 546	76, 571	38, 240	121, 082	3, 574	13, 393	67, 360	211, 046

ACTUAL CASES

Product and size	Cases	Value
Alewives:		
16-ounce (48 cans)	17, 519	$39, 034
17-ounce (24 cans)	4, 206	5, 423
15 and 19-ounce (24 cans)	28, 763	34, 516
Total		78, 973
Alewife roe:		
7½, 8, and 8½-ounce (48 cans)	9, 181	30, 438
16-ounce (24 cans)	3, 278	5, 851
17-ounce (24 cans)	41, 341	79, 279
19-ounce (24 cans)	5, 746	12, 037
Other sizes (standard cases)	997	4, 468
Total		132, 073
Grand total		211, 046

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of 1-pound cans, 48 to the case. Alewives or alewife roe were canned at 8 plants in Maryland, 20 in Virginia, and 3 in North Carolina.

Pack of canned shrimp, 1931

STANDARD CASES

State	Dry pack (in tins)		Wet pack (in tins)		Wet pack (in glass)[1]		Total	
	Cases	Value	Cases	Value	Cases	Value	Cases	Value
South Carolina and Alabama	10, 946	$48, 677	46, 315	$216, 317			57, 261	$264, 994
Georgia	16, 551	85, 101	41, 945	222, 411			58, 496	307, 512
Florida	2, 203	11, 530	31, 755	165, 833	14, 235	$135, 569	48, 193	312, 932
Mississippi	60, 194	243, 140	141, 765	548, 813			201, 959	791, 953
Louisiana	85, 054	429, 004	278, 193	1, 336, 583			363, 247	1, 765, 587
Texas	7, 305	35, 938	58, 564	264, 779	15, 820	142, 408	81, 689	443, 125
Georgia and Louisiana					10, 530	96, 144	10, 530	96, 144
Total	182, 253	853, 390	598, 537	2, 754, 736	40, 585	374, 121	821, 375	3, 982, 247

[1] The pack of shrimp in glass for Georgia and Louisiana has been grouped to avoid the disclosure of private enterprise.

Pack of canned shrimp, 1931—Continued

ACTUAL CASES

Size	Cases	Value
In tins, dry:		
4-ounce (48 cans)	8,251	$32,349
5-ounce (48 cans)	153,212	687,965
8, 8¼, and 8½ ounce (24 cans)	22,145	110,623
Other sizes (standard cases)	4,163	22,453
In tins, wet:		
3¾, 4, and 5 ounce (48 cans)	18,752	91,129
5¾-ounce (48 cans)	571,072	2,583,495
8¼ to 9¾ ounce (24 cans)	6,341	28,412
Other sizes (standard cases)	7,141	51,700
In glass, wet:		
5¼-ounce (24 cans)	75,802	330,298
5¾-ounce (24 cans)	7,333	21,408
Other sizes (standard cases)	2,315	22,415
Total	----------	3,982,247

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of 5-ounce cans, 48 to the case, in the dry pack and 5¾-ounce cans, 48 to the case, in the wet pack. Shrimp were canned at 2 plants in South Carolina, 5 in Georgia, 6 in Florida, 2 in Alabama, 15 in Mississippi, 19 in Louisiana, and 6 in Texas.

Pack of canned oysters, 1931

STANDARD CASES

State	Cases	Value	State	Cases	Value
North Carolina, Georgia, and Florida	16,388	$50,218	Louisiana	24,415	$85,278
South Carolina	74,186	224,248	Washington	7,930	40,805
Alabama	23,551	75,332	Total	306,278	963,525
Mississippi	159,808	487,644			

ACTUAL CASES

Size	Cases	Value
4-ounce (48 cans)	37,388	$102,233
5-ounce (48 cans)	219,521	669,512
6-ounce (48 cans)	2,717	13,653
8-ounce (24 cans)	22,557	74,892
10-ounce (24 cans)	35,543	103,235
Total	----------	963,525

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of 5-ounce cans, 48 to the case. Oysters were canned at 1 plant in North Carolina, 7 in South Carolina, 2 in Georgia, 2 in Florida, 3 in Alabama, 16 in Mississippi, 8 in Louisiana, and 4 in Washington. The pack during the spring period (January to May, 1931) amounted to 238,850 standard cases, valued at $757,468 and that during the fall period (September to December, 1931) amounted to 67,428 standard cases, valued at $206,057. The pack during the spring period of 1930 amounted to 333,174 standard cases, valued at $1,605,647 and during the fall period of 1930, 63,000 standard cases, valued at $231,215.

Pack of canned clams and clam products, 1931

Item and State	Cases	Value
Razor clams (Washington, Oregon, and Alaska):		
Whole—		
No. 1, 5-ounce (48 cans)	3,819	$37,808
No. 2, 10-ounce (24 cans)	140	1,260
Other sizes (standard cases)	104	822
Minced—		
½-pound flat, 4-ounce (48 cans)	61,254	427,428
No. 1, 5-ounce (48 cans)	20,712	176,058
No. 2, 10-ounce (24 cans)	1,056	9,188
Other sizes (standard cases)	2,307	21,873
Juice—All sizes (standard cases)	364	1,120
Total	89,756	675,557
Total (standard cases)	77,505	
Hard clams (Rhode Island, New York, New Jersey, Georgia, Florida, Washington, and Alaska):[1]		
Whole—		
No. 1, 5-ounce (48 cans)	4,670	39,833
1-pound 8-ounce (48 cans)	3,133	21,751
No. 2, 10-ounce (24 cans)	7,700	48,312
No. 10, 52-ounce (6 cans)	4,250	21,250
Other sizes (standard cases)	763	3,879
Minced—		
No. 1, 5-ounce (48 cans)	908	6,801
No. 2, 10-ounce (24 cans)	1,483	10,383
Other sizes (standard cases)	5,997	38,787
Chowder—		
No. 1, 10-ounce (48 cans)	163,857	604,266
33-ounce (24 jars)	133	1,319
Other sizes (standard cases)	56,291	234,384
Juice—		
No. 1, 10-ounce (48 cans)	527	1,716
No. 10, 102-ounce (6 cans)	1,697	5,489
Other sizes (standard cases)	3,223	17,625
Cocktail—		
3 and 4 ounce (48 jars)	1,092	7,374
8-ounce (24 jars)	249	1,387
Other sizes (standard cases)	216	2,513
Broth and bouillon [1]—		
3½ and 4 ounce (48 jars)	299	1,302
10-ounce (48 jars)	1,148	6,411
Other sizes (standard cases)	3,082	16,311
Total	260,718	1,091,093
Total (standard cases)	263,377	
Soft clams (Maine and Massachusetts):		
Whole—		
No. 1, 5-ounce (48 cans)	66,333	240,763
1-pound 8-ounce (48 cans)	7,945	46,734
No. 2, 10-ounce (24 cans)	10,159	34,473
Other sizes (standard cases)	9,501	20,793
Chowder—		
No. 1, 10-ounce (48 cans)	17,082	53,856
No. 2, 20-ounce (24 cans)	1,132	3,923
Other sizes (standard cases)	27,180	54,898
Bouillon and juice—		
No. 2, 20-ounce (24 cans)	5,788	10,419
Other sizes (standard cases)	8,951	24,400
Total	154,071	490,259
Total (standard cases)	159,158	
Grand total (standard cases)	500,040	2,256,909

[1] Includes a small amount of coquina broth packed in Florida.

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of 5-ounce cans, 48 No. 1 to the case, for whole and minced clams; and 48 No. 1, 10-ounce cans to the case, for other clam products. Razor clam products were canned at 12 plants in Washington, 5 in Oregon, and 6 in Alaska; hard clam products, at 1 plant in Rhode Island, 3 in New York, 1 in New Jersey, 1 in Georgia, 1 in Florida, 5 in Washington, and 1 in Alaska; soft clam products, at 21 plants in Maine and 2 in Massachusetts; and coquina clam products, at 2 plants in Florida.

Pack of miscellaneous canned fishery products in the United States and Alaska, 1931

Item	Standard cases	Value	Item	Standard cases	Value
Mackerel	102, 392	$246, 848	Salmon eggs (for bait)	5, 246	$149, 186
Shad	747	2, 091	Sturgeon caviar [2]	4, 630	609, 502
Shad roe	2, 100	63, 060	Whitefish roe and caviar	829	23, 498
Fish flakes	28, 486	514, 553	Miscellaneous roe and caviar [3]	1, 966	13, 896
Fish cakes, balls, etc	103, 704	779, 411	Crabs	646	12, 817
Cat and dog food	52, 509	143, 345	Turtle products	4, 058	74, 945
Miscellaneous fish [1]	7, 425	63, 974	Miscellaneous shellfish [4]	11, 839	82, 608
Salmon roe and caviar	3, 360	30, 486			
			Total	329, 937	2, 810, 220

[1] Includes canned carp, eels, fillets, finnan haddie, smoked salmon, anchovy paste, halibut and salmon fish pudding, haddock chowder, and bait herring and candlefish.
[2] Produced principally from imported sturgeon.
[3] Includes canned fish roe from various species of ground fish and imported roe from fish other than sturgeon.
[4] Includes canned terrapin products, mussels, abalone, squid, and shrimp creole gumbo.

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of 1-pound cans, 48 to the case.

Production of miscellaneous by-products, 1931

Product	Atlantic and Gulf coasts		Pacific coast (including Alaska)		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
Dried scrap:						
Alewife ... tons	515	$19, 113			515	$19, 113
Crab, blue, and king ... do	3, 178	62, 364			3, 178	62, 364
Miscellaneous [1] ... do	516	17, 030			516	17, 030
Meal:						
Herring (Alaska) ... do			7, 911	$272, 825	7, 911	272, 825
Herring (Maine) ... do	1, 398	34, 540			1, 398	34, 540
Pilchard ... do			16, 319	610, 462	16, 319	610, 462
Salmon ... do			2, 435	108, 682	2, 435	108, 682
Tuna ... do			5, 078	169, 505	5, 078	169, 505
Ground fish ... do	10, 928	646, 252			10, 928	646, 252
Shrimp ... do	[2] 1, 282	[2] 24, 985	(2)	(2)	1, 282	24, 985
Miscellaneous [3] ... do	1, 466	58, 535	2, 376	119, 411	3, 842	177, 946
Miscellaneous green scrap [4] ... do	917	4, 757			917	4, 757
Oil:						
Alewife ... gallons	16, 696	2, 598			16, 696	2, 598
Cod and cod-liver ... do	95, 809	62, 600			95, 809	62, 600
Herring (Alaska) ... do			2, 152, 706	376, 582	2, 152, 706	376, 582
Herring (Maine) ... do	91, 003	12, 249			91, 003	12, 249
Pilchard ... do			3, 916, 336	807, 647	3, 916, 336	807, 647
Salmon ... do			250, 871	41, 129	250, 871	41, 129
Tuna ... do			15, 939	3, 296	15, 939	3, 296
Miscellaneous [5] ... do	8, 470	5, 705	36, 031	5, 822	44, 501	11, 527
Liquid glue ... do	[6] 433, 030	[6] 1, 043, 290	(6)	(6)	433, 030	1, 043, 290
Miscellaneous by-products [7] ... pounds	404, 630	34, 860	32, 304	365, 407	436, 934	400, 267
Total		2, 028, 878		2, 880, 768		4, 909, 646

[1] Includes ground fish and miscellaneous dried scrap.
[2] A small quantity of shrimp meal produced in California is included with the production of the Atlantic and Gulf coasts.
[3] Includes king crab meal, clam meal, mackerel meal, salmon egg and liver meal, fish flour, and miscellaneous meal.
[4] Includes herring pomace (Maine), herring waste (Maine), and miscellaneous green scrap.
[5] Includes tanners oil, shark oil, mackerel oil, and miscellaneous oil.
[6] A quantity of liquid glue produced by one firm in California is included with the production of the Atlantic and Gulf coasts.
[7] Includes herring skins and scales, fish scale ornaments, shark skins and fins, ground clam shells, agar-agar and kelp products.

NOTE.—The oils produced on the Pacific coast are reported in trade gallons (7½ pounds) and those produced on the Atlantic and Gulf coasts are reported in United States gallons (about 7.74 pounds).

Production of oyster-shell products, 1931

State	Crushed oyster shell for poultry feed		Oyster-shell lime		Total	
	Tons	Value	Tons	Value	Tons	Value
Rhode Island and New Jersey	6,700	$69,270	1,760	$7,620	8,460	$76,890
Pennsylvania	4,123	44,822	1,453	6,166	5,576	50,988
Maryland	34,045	235,024	15,593	32,668	49,638	267,692
Virginia	19,941	175,669	[1] 23,702	149,370	43,643	325,039
North Carolina and South Carolina	7,263	66,193	525	2,670	7,788	68,863
Florida and California	47,204	252,952	2,215	7,869	49,419	260,821
Alabama and Texas	7,824	48,381	1,075	925	8,899	49,306
Mississippi	32,801	224,200	1,855	1,000	34,656	225,200
Louisiana	93,729	654,027	4,421	13,198	98,150	667,225
Total	253,630	1,770,538	52,599	221,486	306,229	1,992,024

[1] Of this amount, 11,207 tons, valued at $85,884, were reported as "burned" lime.

NOTE.—Crushed oyster-shell products were prepared at 2 plants in Rhode Island, 5 in New Jersey, 5 in Pennsylvania, 6 in Maryland, 8 in Virginia, 3 in North Carolina, 4 in South Carolina, 3 in Florida, 2 in Alabama, 6 in Mississippi, 4 in Louisiana, 1 in Texas, and 3 in California.

Production of fresh-water mussel-shell products, 1931

Item	Iowa		New York		Other States		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Pearl buttons.....gross	11,088,981	$3,356,426	4,517,622	$1,116,894	1,081,893	$267,494	16,688,496	$4,740,814
Crushed shell for poultry feed.....tons	9,871	90,661	--------	--------	305	2,353	10,176	93,014
Lime.....do	9,091	9,091	(1)	(1)	[1] 267	[1] 486	9,358	9,577
Other products [2]	--------	126,835	--------	--------	--------	--------	--------	126,835
Total	--------	3,583,013	--------	1,116,894	--------	270,333	--------	4,970,240

[1] A small production made in New York has been included with "Other States."
[2] Includes stucco, colored shells, and "pearl novelties."

Production of marine pearl-shell products,[1] 1931

Item	Maine, Massachusetts, and Connecticut		Rhode Island		New York		New Jersey	
	Gross	Value	Gross	Value	Gross	Value	Gross	Value
Pearl buttons	1,328,513	$964,520	--------	--------	98,764	$100,295	1,310,536	$1,017,334
Novelties [2]	--------	103,845	--------	$18,067	--------	37,848	--------	322,329
Total	--------	1,068,365	--------	18,067	--------	138,143	--------	1,339,663

Item	Pennsylvania, Maryland, and Florida		California		Total	
	Gross	Value	Gross	Value	Gross	Value
Pearl buttons	1,741,650	$801,515	--------	--------	4,479,463	$2,883,664
Novelties [2]	--------	148,777	--------	$38,373	--------	669,239
Total	--------	950,292	--------	38,373	--------	3,552,903

[1] Produced principally from imported shells.
[2] Includes buckles, inlays for jewelry, knife handles, lamps, handles for manicure sets, ornaments, etc.

NOTE.—Marine pearl-shell products were manufactured at 1 plant in Maine, 2 in Massachusetts, 3 in Rhode Island, 6 in Connecticut, 10 in New York, 23 in New Jersey, 3 in Pennsylvania, 1 in Maryland, 3 in Florida, and 3 in California.

Fish utilized and products of the menhaden industry, 1931

State	Menhaden utilized	Products						
		Dry scrap and meal		Acidulated scrap		Oil		Total
	Number	*Tons*	*Value*	*Tons*	*Value*	*Gallons*	*Value*	*Value*
New Jersey, Delaware, South Carolina, and Georgia	69,540,000	2,140	$83,812	6,487	$94,181	397,028	$63,891	$241,884
Virginia	155,801,000	11,373	366,107			1,122,974	169,471	535,578
North Carolina	45,099,000	2,747	92,417	865	14,449	283,659	40,165	147,031
Florida	82,444,000	4,833	159,205	1,419	27,763	178,129	28,781	215,749
Total	[1] 352,884,000	[2] 21,093	701,541	8,771	136,393	1,981,790	302,308	1,140,242

[1] 211,730,400 pounds.

[2] Of this quantity 18,185 tons, valued at $586,413, were reported as dry scrap, and 2,908 tons, valued at $115,128, as fish meal.

NOTE.—The menhaden factories were located as follows: 2 in New Jersey, 1 in Delaware, 8 in Virginia, 9 in North Carolina, 1 in South Carolina, 1 in Georgia, and 5 in Florida.

PACKAGED-FISH TRADE

In 1931, the production of fresh, frozen, and smoked packaged fish in the United States amounted to 65,550,700 pounds, valued at $9,223,507. The most important species packaged was haddock, which alone accounted for 42,976,541 pounds valued at $6,095,930.

Production of fresh, frozen, and smoked packaged fish in the United States, 1931

Species	Maine		Massachusetts and Connecticut		New York	
	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike					172,400	$36,537
Cod	350,426	$55,079	6,797,265	$834,253	2,247,346	330,703
Cusk	209,025	34,850	1,275,566	188,939		
Flounders, including "sole"	(1)	(1)	[1] 929,545	[1] 190,149	511,080	90,670
Haddock	426,439	70,257	39,480,663	5,570,200	2,879,939	427,187
Hake	292,295	38,168	1,944,252	214,129	1,425,293	166,936
Halibut			474,973	85,343		
Mackerel			[2] 136,063	[2] 23,869		
Pollock			445,923	43,422		
Salmon			222,033	41,242		
Wolffish			199,554	23,603		
Yellow perch					(4)	(4)
Miscellaneous [5]			1,161,177	89,154		
Total	1,278,185	198,354	53,067,014	7,304,303	7,236,058	1,052,033

Species	Pennsylvania		Virginia and North Carolina		Florida, Alabama, and Texas	
	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike	649,393	$124,999				
Croaker			49,170	$5,593		
Drum, red or redfish					8,200	$1,568
Flounders, including "sole"			37,900	5,393		
Groupers					154,000	22,200
Haddock			189,500	28,286		
Mullet					19,000	2,800
Sea bass			27,030	4,157		
Snapper, red					[3] 149,553	[3] 28,822
Spanish mackerel					15,500	3,140
Squeteague or "sea trout"			597,000	58,048	24,000	7,160
Yellow perch	[4] 41,560	[4] 8,261				
Miscellaneous [5]			11,000	1,021	35,715	9,483
Total	690,953	133,260	911,600	102,498	405,968	75,173

See footnotes at end of table.

Production of fresh, frozen, and smoked packaged fish in the United States, 1931—Continued

Species	Ohio, Illinois, Minnesota, and Wisconsin		California and Washington		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike	703,922	$136,305			1,525,715	$297,841
Cod					9,395,037	1,220,035
Croaker					49,170	5,593
Cusk					1,484,591	223,789
Drum, red or redfish					8,200	1,568
Flounders, including "sole"					1,478,525	286,212
Groupers					154,000	22,200
Haddock					42,976,541	6,095,930
Hake					3,661,840	419,233
Halibut			142,000	$20,000	616,973	105,343
Mackerel			(2)	(2)	136,063	23,869
Mullet					19,000	2,800
Pollock					445,923	43,422
Salmon			80,000	10,150	302,033	51,392
Sea bass					27,030	4,157
Snapper, red			(3)	(3)	149,553	28,822
Spanish mackerel					15,500	3,140
Squeteague or "sea trout"					621,000	65,208
Wolffish					199,554	23,603
Yellow perch	826,945	156,718			868,505	164,979
Yellow pike	24,000	5,100			24,000	5,100
Miscellaneous [5]	35,690	6,255	148,365	23,358	1,391,947	129,271
Total	1,590,557	304,378	370,365	53,508	[6] 65,550,700	[6] 9,223,507

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[1] A small amount of flounders in Maine has been included with Massachusetts and Connecticut.

[2] A small amount of mackerel in California has been included with Massachusetts and Connecticut.

[3] A small amount of red snapper in Washington has been included with Florida, Alabama, and Texas.

[4] A small amount of yellow perch in New York has been included with Pennsylvania.

[5] Includes amberfish, bluefish, butterfish, cabio, frog legs, jewfish, lake herring, lake trout, "lingcod," mangrove snapper, pinfish, pompano, sablefish, sauger pike, sheepshead, snook, spots, swordfish, tripletail, whitefish, whiting, and a small amount of mixed fish.

[6] Of this amount 61,928,737 pounds, valued at $8,761,731, were fillets; 1,142,521 pounds, valued at $154,895, were dressed or pan dressed; 1,837,224 pounds, valued at $204,386, were sticks; 495,193 pounds, valued at $77,271, were steaks; and 147,025 pounds, valued at $25,224, were prepared by other methods. Of the total quantity of fillets prepared 44,437,899 pounds, valued at $6,364,430, were fresh; 15,451,637 pounds, valued at $2,071,684, were frozen; and 2,039,201 pounds, valued at $325,617, were smoked. Of the dressed and pan dressed 596,229 pounds, valued at $63,768, were fresh; 502,308 pounds, valued at $84,529, were frozen; and 43,984 pounds, valued at $6,598, were smoked. Of the sticks, 686,680 pounds, valued at $117,844, were fresh; and 1,150,544 pounds, valued at $86,542, were frozen. Of the steaks, 62,000 pounds, valued at $14,620, were fresh and 433,193 pounds, valued at $62,651, were frozen. There were prepared by other methods 147,025 pounds, valued at $25,224.

NOTE.—Fish products were packaged at 6 plants in Maine; 58 in Massachusetts; 35 in New York; 1 in Connecticut; 8 in Pennsylvania; 6 in Virginia; 1 in North Carolina; 7 in Florida; 1 in Alabama; 23 in Ohio; 1 in Illinois; 1 in Minnesota; 2 in Wisconsin; 3 in California; and 5 in Washington—a total of 158 plants.

FROZEN-FISH TRADE

FISH FROZEN

In 1931 the freezing plants in the United States and Alaska, reporting their activities to the Government, packed 112,257,416 pounds of frozen fishery products. These products at the time they were held in cold-storage plants were estimated to be valued at $11,000,000. Compared with the pack in 1930, which was the largest frozen pack of fishery products on record, this is a decrease of 19 per cent in the volume of the pack. Over 60 per cent of the pack consisted of six groups of fishery products. Of first importance was the cod, haddock, haddock fillets, hake, and pollock group with 14 per cent of the total. Haddock fillets accounted for the bulk of the volume of this group. Of next importance were the salmons and halibut, each with 12 per cent of the total. Mackerel made up 11 per cent of the total; whiting, 7 per cent; and sea herring, 6 per cent. Considerable quantities of shellfish; weakfish, including southern "sea trout"; cisco or lake herring; butterfish; and squid, also were frozen. Frozen squid and sea herring are marketed primarily for bait, although quantities of each are used for human consumption.

Production of frozen fishery products, 1931

BY SPECIES AND MONTHS

Species	Month ended the 15th of—						
	January	February	March	April	May	June	July
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	10, 672	14, 313	8, 013	2, 574	20, 965	11, 968	7, 098
Butterfish (all trade sizes)	9, 110	8, 986	2, 419	3, 643	35, 965	496, 044	222, 197
Catfish	45, 135	18, 655	10, 861	3, 831	84, 679	66, 645	82, 324
Cisco (Lake Erie)	15, 620	----------	----------	----------	929	362	7, 641
Cisco (lake herring), including bluefin, blackfin, and chub	88, 429	102, 893	22, 354	4, 393	20, 952	47, 616	48, 726
Cisco (tullibees, Canadian lakes)	45, 508	65, 356	42, 653	2, 097	22, 976	1, 741	18, 448
Cod, haddock, hake, pollock	256, 763	45, 732	72, 695	98, 060	113, 987	91, 578	174, 754
Croaker	6, 028	10, 570	42, 144	6, 508	528, 525	173, 570	155, 249
Flounders	53, 818	7, 179	12, 717	11, 656	198, 399	292, 991	98, 302
Haddock fillets	650, 238	455, 758	363, 271	1, 576, 376	1, 749, 624	1, 103, 885	1, 560, 296
Halibut (all trade sizes)	339, 931	213, 250	59, 716	275, 795	2, 459, 219	2, 140, 703	2, 357, 612
Herring, sea (including alewives and bluebacks)	124, 435	43, 093	51, 715	168, 644	963, 268	467, 725	361, 740
Lake trout	20, 762	7, 623	3, 561	93, 902	50, 356	23, 403	82, 583
Mackerel (except Spanish)	149, 693	162, 449	103, 755	99, 314	48, 507	776, 093	2, 507, 914
Pike, blue and sauger	28, 232	2, 639	5, 292	2, 728	429, 975	130, 241	36, 088
Pike, yellow or wall-eyed	59, 546	57, 987	26, 895	57, 248	55, 640	23, 493	20, 480
Pike (including pickerel, jacks, and yellow jack)	51, 917	58, 091	46, 352	34, 234	54, 175	15, 499	20, 171
Sablefish (black cod)	18, 474	140, 032	11, 283	9, 774	48, 667	29, 316	91, 762
Salmon, chinook	420	6, 782	4, 758	2, 170	122, 208	113, 365	389, 876
Salmon, silver	71, 945	99, 149	36, 763	19, 344	28, 232	46, 408	86, 312
Salmon, fall and pink	53, 304	48, 827	20, 858	16, 135	14, 517	41, 485	16, 010
Salmon, steelhead trout	57, 190	770	7, 365	9, 911	18, 691	18, 748	372, 381
Salmon, all other	58, 140	59, 435	161, 985	137, 836	155, 848	544, 228	340, 957
Scup (porgies)	3, 052	1, 243	4, 238	297	3, 075	156, 834	48, 412
Shad and shad roe	86, 017	13, 395	25, 665	34, 150	84, 092	166, 630	72, 648
Shellfish	607, 824	176, 215	151, 366	133, 698	288, 642	516, 073	475, 357
Smelts, eulachon, etc	316, 396	380, 248	285, 680	42, 715	3, 007	9, 078	5, 919
Squid	17, 791	6, 566	2, 767	95, 824	292, 205	890, 960	142, 323
Sturgeon and spoonbill cat	68, 483	4, 715	1, 572	9, 530	43, 656	112, 233	70, 484
Suckers	18, 905	6, 929	----------	440	22, 269	4, 943	11, 920
Weakfish (including southern "sea trout")	24, 205	75, 452	70, 745	32, 981	157, 565	215, 779	45, 153
Whitefish	83, 442	44, 251	56, 904	10, 862	79, 587	86, 838	208, 412
Whiting	96, 484	249, 117	279, 717	330, 770	131, 683	2, 782, 800	1, 983, 218
Miscellaneous fish	768, 512	572, 420	493, 794	653, 797	1, 522, 864	1, 360, 626	1, 204, 694
Total	4, 306, 421	3, 160, 120	2, 489, 873	3, 980, 966	9, 854, 949	12, 959, 901	13, 327, 461

Species	Month ended the 15th of—					
	August	September	October	November	December	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	246, 005	314, 737	401, 153	169, 072	27, 998	1, 234, 568
Butterfish (all trade sizes)	300, 713	197, 986	148, 744	519, 711	167, 963	2, 113, 301
Catfish	45, 359	90, 523	101, 960	65, 812	58, 455	674, 239
Cisco (Lake Erie)	43, 521	40, 127	15, 910	45, 986	66, 429	236, 525
Cisco (lake herring), including bluefin, blackfin, and chub	117, 178	84, 072	195, 187	681, 730	897, 785	2, 311, 315
Cisco (tullibees, Canadian lakes)	20, 609	18, 007	18, 905	35, 812	44, 533	336, 645
Cod, haddock, hake, pollock	410, 836	201, 670	481, 146	431, 669	452, 096	2, 830, 986
Croaker	417, 140	247, 826	58, 183	47, 033	11, 065	1, 703, 841
Flounders	44, 637	85, 453	156, 813	98, 174	94, 938	1, 154, 986
Haddock fillets	1, 656, 055	1, 277, 577	940, 073	665, 155	945, 489	12, 943, 797
Halibut (all trade sizes)	2, 480, 697	1, 447, 465	572, 764	431, 831	200, 709	12, 979, 692
Herring, sea (including alewives and bluebacks)	1, 050, 573	825, 881	942, 705	1, 691, 225	452, 184	7, 143, 188
Lake trout	35, 033	29, 585	140, 088	580, 898	227, 718	1, 295, 512
Mackerel (except Spanish)	1, 745, 618	5, 041, 176	1, 291, 930	284, 915	140, 972	12, 352, 336
Pike, blue and sauger	59, 369	19, 473	75, 950	283, 567	356, 010	1, 429, 564
Pike, yellow or wall-eyed	7, 007	10, 155	108, 567	63, 709	43, 040	533, 767
Pike (including pickerel, jacks, and yellow jack)	25, 842	3, 316	75, 568	78, 697	35, 656	499, 518

Production of frozen fishery products, 1931—Continued

BY SPECIES AND MONTHS—Continued

Species	Month ended the 15th of—					
	August	September	October	November	December	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Sablefish (black cod)	155, 108	179, 543	368, 641	473, 652	224, 031	1, 750, 283
Salmon, chinook	388, 221	135, 865	33, 675	32, 748	2, 389	1, 232, 477
Salmon, silver	895, 271	1, 534, 794	1, 481, 338	739, 064	70, 311	5, 108, 931
Salmon, fall and pink	387, 609	159, 511	82, 997	1, 226, 023	82, 279	2, 149, 555
Salmon, steelhead trout	630, 273	298, 125	55, 035	11, 517	5, 160	1, 485, 166
Salmon, all other	575, 117	481, 704	237, 341	234, 280	47, 488	3, 034, 359
Scup (porgies)	56, 698	59, 479	35, 730	25, 810	3, 219	398, 087
Shad and shad roe	114, 756	41, 283	41, 638	65, 603	20, 677	766, 554
Shellfish	219, 617	390, 320	607, 655	1, 160, 985	982, 730	5, 710, 482
Smelts, eulachon, etc	3, 104	15, 334	40, 133	45, 866	184, 874	1, 332, 354
Squid	91, 596	139, 471	40, 576	110, 496	44, 408	1, 874, 983
Sturgeon and spoonbill cat	23, 484	19, 719	29, 238	18, 365	8, 091	409, 570
Suckers	1, 005	470	4, 471	12, 059	6, 251	89, 662
Weakfish (including southern "sea trout")	318, 437	514, 038	438, 142	369, 263	78, 368	2, 340, 128
Whitefish	59, 623	125, 895	59, 774	67, 098	194, 735	1, 077, 421
Whiting	610, 948	318, 720	591, 971	393, 733	141, 983	7, 911, 144
Miscellaneous fish	983, 014	1, 273, 676	1, 416, 281	1, 807, 838	1, 754, 964	13, 812, 480
Total	14, 220, 073	15, 622, 976	11, 290, 282	12, 969, 396	8, 074, 998	112, 257, 416

BY GEOGRAPHICAL SECTIONS AND SPECIES[1]

[Expressed in thousands of pounds; that is, 000 omitted]

Species	New England	Middle Atlantic	South Atlantic	North Central, East	North Central, West	South Central	Pacific	Total
Bluefish (all trade sizes)	30	1, 120	12	70	2	--------	--------	1, 234
Butterfish (all trade sizes)	390	1, 638	49	34	2	--------	--------	2, 113
Catfish	47	5	175	109	318	20	--------	674
Cisco (Lake Erie)	--------	237	--------	--------	--------	--------	--------	237
Cisco (lake herring), including bluefin, blackfin, and chub	--------	382	--------	1, 407	522	--------	--------	2, 311
Cisco (tullibees, Canadian lakes)	50	106	20	97	63	1	--------	337
Cod, haddock, hake, pollock	2, 226	316	2	76	44	3	164	2, 831
Croaker	--------	731	897	76	--------	--------	--------	1, 704
Flounders	456	664	1	15	--------	--------	19	1, 155
Haddock fillets	11, 949	261	11	351	244	17	111	12, 944
Halibut (all trade sizes)	254	604	2	931	90	1	11, 098	12, 980
Herring, sea (including alewives and bluebacks)	5, 358	321	4	373	--------	2	1, 085	7, 143
Lake trout	--------	133	12	909	238	1	3	1, 296
Mackerel (except Spanish)	10, 599	1, 267	1	124	26	--------	335	12, 352
Pike, blue and sauger	--------	992	--------	383	--------	5	50	1, 430
Pike, yellow or wall-eyed	--------	76	--------	174	284	--------	--------	534
Pike (including pickerel, jacks, and yellow jack)	--------	16	--------	113	371	--------	--------	500
Sablefish (black cod)	--------	1	--------	127	38	--------	1, 584	1, 750
Salmon, Chinook	16	15	--------	38	7	--------	1, 156	1, 232
Salmon, silver	34	235	--------	90	49	--------	4, 701	5, 109
Salmon, fall and pink	100	15	--------	66	64	--------	1, 905	2, 150
Salmon, steelhead trout	2	37	1	3	--------	--------	1, 442	1, 485
Salmon, all other	87	325	8	112	19	--------	2, 483	3, 034
Scup (porgies)	62	335	--------	1	--------	--------	--------	398
Shad and shad roe	251	256	4	61	2	2	191	767
Shellfish	497	2, 392	849	838	272	9	853	5, 710
Smelts, eulachon, etc	38	1, 143	--------	59	4	--------	88	1, 332
Squid	1, 096	758	--------	9	--------	--------	12	1, 875
Sturgeon and spoonbill cat	--------	194	10	22	58	98	28	410
Suckers	--------	1	--------	82	--------	7	--------	90
Weakfish (including southern "sea trout")	--------	2, 085	255	--------	--------	--------	--------	2, 340
Whitefish	24	398	28	580	47	--------	--------	1, 077
Whiting	5, 899	791	12	10	1, 199	--------	--------	7, 911
Miscellaneous fish	1, 917	2, 492	2, 144	2, 798	708	1, 509	2, 244	13, 812
Total	41, 382	20, 342	4, 497	10, 138	4, 671	1, 675	29, 552	112, 257

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[1] New England includes the 6 States of that section; Middle Atlantic—New York, New Jersey, and Pennsylvania; South Atlantic—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida; North Central, East—Ohio, Indiana, Illinois, Michigan, and Wisconsin; North Central, West—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas; South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas; Pacific—Washington, Oregon, California, and Alaska.

Production of frozen fishery products, 1931—Continued

BY GEOGRAPHICAL SECTIONS AND MONTHS [1]

[Expressed in thousands of pounds; that is, 000 omitted]

Month ended the 15th of—	New England	Middle Atlantic	South Atlantic	North Central, East	North Central, West	South Central	Pacific	Total
January	992	1, 344	298	708	333	113	518	4, 306
February	470	1, 061	69	370	490	58	642	3, 160
March	277	1, 011	12	200	406	112	472	2, 490
April	1, 687	560	23	287	542	93	789	3, 981
May	2, 947	1, 695	416	954	457	256	3, 130	9, 855
June	5, 658	2, 574	283	832	344	217	3, 052	12, 960
July	6, 648	1, 239	433	724	299	286	3, 699	13, 328
August	5, 727	1, 309	770	475	271	60	5, 608	14, 220
September	8, 266	1, 820	535	367	261	61	4. 313	15, 623
October	4, 199	2, 488	310	1, 029	251	147	2, 866	11, 290
November	2, 685	3, 376	459	1, 885	684	159	3, 721	12, 969
December	1, 826	1, 865	889	2, 307	335	113	742	8, 075
Total	41, 382	20, 342	4, 497	10, 138	4, 671	1, 675	29, 552	112, 257

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[1] New England includes the 6 States of that section; Middle Atlantic—New York, New Jersey, and Pennsylvania; South Atlantic—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida; North Central, East—Ohio, Indiana. Illinois, Michigan, and Wisconsin; North Central, West—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas; South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas; Pacific—Washington, Oregon, California, and Alaska.

HOLDINGS

During 1931 the average monthly holdings of frozen fish and shellfish were 12 per cent less than the average monthly holdings during 1930, and 5 per cent greater than the 5-year average of monthly holdings. Individual monthly holdings during the year were above normal for 7 months of the year when compared with the 5-year average, being from less than 1 to 27 per cent higher. Compared with the respective monthly holdings in 1930, they were from 8 to 15 per cent greater during 4 months of the year, and 8 to 27 per cent less during the remaining 8 months of the year. Monthly holdings in 1931 were largest in January and from September to December, inclusive, being, in some instances, over double those for certain months from February to August, inclusive. A maximum of 74,725,000 pounds was held on November 15, and a minimum of 28,095,000 pounds on April 15. Holdings during the year averaged 54,999,000 pounds monthly.

Holdings of frozen fishery products, by species and months, 1931

Species	Month ended the 15th of—					
	January	February	March	April	May	June
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	514, 141	403, 792	240, 335	134, 267	119, 865	100, 588
Butterfish (all trade sizes)	534, 291	366, 585	169, 185	79, 589	55, 300	521, 562
Catfish	491, 776	389, 900	203, 073	111, 294	141, 012	190, 344
Cisco (Lake Erie)	275, 251	245, 672	99, 781	61, 335	45, 151	41, 227
Cisco (lake herring), including bluefin, blackfin, and chub	1, 795, 845	1, 361, 049	1, 013, 578	620, 060	484, 270	443, 304
Cisco (tullibees, Canadian lakes)	1, 294, 644	1, 218, 217	812, 210	474, 664	534, 572	688, 762
Cod, haddock, hake, pollock	1, 914, 169	1, 716, 179	1, 290, 678	1, 037, 708	986, 832	915, 664
Croaker	919, 201	591, 923	221, 291	126, 622	609, 136	755, 777
Flounders	728, 018	599, 741	469, 915	326, 060	413, 981	593, 120
Haddock fillets	6, 650, 017	5, 469, 663	4, 216, 387	4, 349, 429	5, 006, 965	4, 851, 787
Halibut (all trade sizes)	7, 223, 395	4, 665. 669	2, 422, 259	2, 196, 011	4, 188, 499	6, 110, 776

Holdings of frozen fishery products, by species and months, 1931—Continued

Species	Month ended the 15th of—					
	January	February	March	April	May	June
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Herring, sea (including alewives and bluebacks)	2, 796, 289	2, 291, 366	1, 767, 238	1, 306, 644	1, 648, 639	1, 373, 827
Lake trout	1, 649, 411	1, 358, 140	919, 804	693, 912	647, 414	626, 000
Mackerel (except Spanish)	4, 781, 239	3, 333, 710	1, 834, 634	574, 224	489, 709	1, 141, 368
Pike, blue and sauger	1, 349, 446	936, 956	388, 509	244, 341	644, 549	801, 246
Pike, yellow or wall-eyed	531, 545	531, 066	338, 815	338, 214	349, 569	332, 096
Pike (including pickerel, jacks, and yellow jack)	373, 099	552, 150	484, 205	444, 077	339, 892	349, 267
Sablefish (black cod)	1, 659, 105	1, 465, 153	1, 077, 947	850, 554	755, 714	614, 151
Salmon, chinook	1, 443, 991	1, 108, 282	659, 155	421, 734	444, 849	482, 145
Salmon, silver	3, 481, 184	2, 377, 032	1, 029, 002	556, 329	342, 932	343, 642
Salmon, fall and pink	1, 708, 354	1, 271, 128	697, 483	527, 860	455, 408	435, 244
Salmon, steelhead trout	509, 124	401, 632	253, 826	227, 291	224, 569	201, 870
Salmon, all other	2, 156, 548	1, 044, 138	636, 463	506, 318	512, 622	891, 977
Scup (porgies)	516, 332	426, 441	287, 220	47, 845	32, 862	182, 055
Shad and shad roe	642, 352	528, 886	296, 783	191, 992	226, 076	364, 329
Shellfish	2, 740, 682	2, 334, 991	1, 610, 745	998, 482	945, 209	1, 323, 069
Smelts, eulachon, etc	804, 898	972, 478	1, 207, 839	488, 468	419, 154	400, 278
Squid	2, 021, 826	1, 668, 707	1, 229, 775	687, 483	737, 914	1, 582, 234
Sturgeon and spoonbill cat	869, 702	786, 085	688, 084	625, 000	488, 104	629, 570
Suckers	121, 675	101, 209	88, 532	68, 420	63, 754	68, 191
Weakfish (including southern "sea trout")	1, 976, 996	1, 321, 749	559, 304	78, 663	212, 630	399, 125
Whitefish	1, 359, 770	1, 319, 975	1, 249, 596	753, 946	617, 918	608, 143
Whiting	6, 017, 992	4, 885, 675	3, 743, 028	2, 777, 158	2, 371, 354	4, 684, 762
Miscellaneous fish	9, 964, 897	8, 514, 701	6, 360, 212	5, 169, 423	5, 726, 970	6, 336, 844
Total	71, 817, 205	56, 560, 040	38, 566, 891	28, 095, 417	31, 283, 394	39, 384, 344

Species	Month ended the 15th of—					
	July	August	September	October	November	December
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	78, 718	303, 419	788, 439	1, 124, 417	1, 136, 460	1, 017, 132
Butterfish (all trade sizes)	708, 736	988, 247	1, 161, 764	1, 255, 883	1, 655, 114	1, 607, 098
Catfish	273, 718	298, 697	336, 209	398, 419	482, 594	498, 493
Cisco (Lake Erie)	25, 514	81, 791	185, 157	297, 683	211, 412	291, 221
Cisco (lake herring), including bluefin, blackfin, and chub	609, 709	650, 558	705, 562	881, 118	1, 389, 160	1, 921, 049
Cisco (tullibees, Canadian lakes)	616, 432	666, 183	596, 826	462, 268	462, 939	511, 840
Cod, haddock, hake, pollock	952, 208	1, 313, 692	1, 248, 284	1, 342, 961	1, 311, 660	1, 380, 124
Croaker	894, 146	1, 221, 064	1, 371, 934	1, 304, 078	1, 206, 702	1, 057, 562
Flounders	465, 614	447, 398	454, 763	498, 092	539, 280	501, 249
Haddock fillets	5, 463, 072	6, 337, 573	6, 424, 296	6, 179, 916	5, 265, 232	5, 583, 849
Halibut (all trade sizes)	8, 499, 702	10, 866, 432	11, 974, 153	11, 817, 147	10, 156, 830	7, 993, 672
Herring sea (including alewives and bluebacks)	1, 245, 567	1, 240, 802	1, 456, 337	2, 001, 653	2, 781, 550	2, 980, 793
Lake trout	631, 035	630, 132	629, 690	697, 027	1, 260, 563	1, 282, 097
Mackerel (except Spanish)	3, 648, 846	5, 290, 973	10, 528, 130	11, 470, 169	10, 560, 441	9, 790, 145
Pike, blue and sauger	507, 284	283, 739	149, 927	226, 268	391, 370	747, 865
Pike, yellow or wall-eyed	292, 100	262, 136	246, 964	342, 124	380, 546	349, 601
Pike (including pickerel, jacks, and yellow jack)	346, 125	351, 235	311, 554	344, 779	484, 522	534, 210
Sablefish (black cod)	615, 724	637, 550	803, 506	1, 042, 544	1, 334, 908	1, 294, 809
Salmon, chinook	804, 128	1, 116, 958	1, 199, 827	1, 129, 410	1, 025, 342	870, 019
Salmon, silver	387, 460	1, 234, 827	2, 688, 686	3, 956, 130	4, 318, 263	3, 564, 743
Salmon, fall and pink	464, 216	813, 119	904, 334	736, 212	1, 728, 769	1, 449, 004
Salmon, steelhead trout	531, 865	1, 115, 299	1, 265, 955	1, 323, 483	1, 176, 501	1, 008, 853
Salmon, all other	1, 087, 461	1, 542, 677	1, 811, 472	1, 932, 868	2, 005, 764	1, 744, 713
Scup (porgies)	228, 067	264, 900	328, 249	359, 272	368, 025	291, 122
Shad and shad roe	430, 255	483, 721	484, 539	536, 944	583, 123	547, 094
Shellfish	1, 450, 752	1, 215, 002	1, 231, 421	1, 395, 085	2, 228, 854	2, 753, 972
Smelts, eulachon, etc	408, 975	397, 740	390, 354	415, 547	402, 581	671, 572
Squid	1, 608, 563	1, 520, 308	1, 360, 238	1, 244. 559	1, 196, 147	1, 037, 326
Sturgeon and spoonbill cat	652, 057	676, 894	1, 012, 564	851, 521	490, 315	322, 373
Suckers	70, 062	54, 143	30, 844	39, 783	48, 737	44, 527
Weakfish (including southern "sea trout")	400, 110	676, 957	1, 142, 356	1, 536, 698	1, 869, 978	1, 502, 712
Whitefish	816, 142	930, 607	979, 733	966, 335	1, 068, 433	1, 298, 401
Whiting	6, 384, 450	6, 579, 190	6, 176, 934	6, 288, 959	6, 085, 647	5, 599, 689
Miscellaneous fish	6, 846, 633	7, 023, 572	7, 701, 521	8, 742, 733	9, 117, 227	10, 233, 469
Total	48, 445, 446	57, 517, 535	68, 082, 522	73, 144, 085	74, 724, 989	72, 362, 398

Monthly holdings of frozen fishery products, 1931, by geographical sections [1]

[Expressed in thousands of pounds; that is 000 omitted]

Month ended the 15th of—	New England	Middle Atlantic	South Atlantic	North Central, East	North Central, West	South Central	Pacific [2]	Total
January	18, 797	16, 511	4, 072	10, 734	4, 514	1, 074	16, 115	71, 817
February	14, 794	13, 612	3, 015	9, 303	4, 613	941	10, 282	56, 560
March	10, 334	9, 606	1, 550	6, 513	3, 777	725	6, 062	38, 567
April	7, 374	6, 183	536	4, 892	3, 458	689	4, 963	28, 095
May	7, 511	6, 736	915	5, 083	3, 314	700	7, 024	31, 283
June	10, 855	8, 894	1, 142	5, 309	3, 307	714	9, 163	39, 384
July	15, 189	9, 568	1, 630	5, 409	3, 432	886	12, 331	48, 445
August	17, 615	10, 983	2, 338	5, 365	3, 317	778	17, 121	57, 517
September	23, 286	12, 838	2, 752	5, 023	3, 184	743	20, 257	68, 083
October	24, 740	14, 274	2, 926	5, 825	3, 231	715	21, 434	73, 145
November	23, 207	15, 790	3, 335	6, 855	3, 839	858	20, 841	74, 725
December	21, 543	16, 705	3, 917	8, 692	3, 921	959	16, 625	72, 362
Average	16, 271	11, 808	2, 344	6, 584	3, 659	815	13, 518	54, 999

[1] New England includes the 6 States of that section; Middle Atlantic—New York, New Jersey, and Pennsylvania; South Atlantic—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida; North Central, East—Ohio, Indiana, Illinois, Michigan, and Wisconsin; North Central, West—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas; South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas; Pacific—Washington, Oregon, California, and Alaska.

[2] Includes a very small amount of fish held in Colorado in the Mountain section.

COLD-STORAGE HOLDINGS OF CURED FISH

Only cured herring and mild-cured salmon are reported held in cold-storage warehouses in the United States and Alaska. Other species are also held in cold storage, but no report is made on them to the Government as their volume reaches but small proportions. During 1931 the monthly holdings of cured herring varied between 11,093,000 pounds in July and 17,070,000 pounds in October. Monthly holdings of mild-cured salmon varied between 2,131,000 pounds in April and 6,952,000 pounds in October. The average monthly holdings of cured fish held in cold storage in 1931 were 12 per cent less than the average monthly holdings during the year 1930, and 24 per cent less than the 5-year average of monthly holdings. The respective monthly holdings in 1931 compared with the respective monthly holdings in 1930 show decreases of from 8 to 24 per cent with the exception of December, which shows an increase of less than one-half of 1 per cent. Compared with the respective normal monthly holdings there were decreases of from 15 to 35 per cent.

Holdings of cured fish, 1931, by species and months

Month ended the 15th of—	Cured herring	Mild-cured salmon	Total
	Pounds	*Pounds*	*Pounds*
January	13, 725, 701	4, 566, 769	18, 292, 470
February	12, 920, 892	3, 818, 845	16, 739, 737
March	11, 763, 133	2, 810, 112	14, 573, 245
April	11, 379, 111	2, 130, 664	13, 509, 775
May	12, 295, 824	2, 277, 581	14, 573, 405
June	12, 020, 472	3, 494, 996	15, 515, 468
July	11, 093, 454	4, 083, 623	15, 177, 077
August	13, 020, 236	6, 333, 197	19, 353, 433
September	15, 387, 573	6, 926, 350	22, 313, 923
October	17, 070, 455	6, 951, 711	24, 022, 166
November	15, 660, 290	6, 470, 950	22, 131, 240
December	15, 525, 499	5, 732, 539	21, 258, 038

FOREIGN FISHERY TRADE

Foreign trade in fishery products in the United States in 1931 amounted to $54,607,646 of which $43,033,389 represents the value of these products imported for consumption, and $11,574,257 the value of exports of domestic fishery products. Compared with the previous year, there is a decrease of 20 per cent in the total trade, 15 per cent in the value of imports, and 33 per cent in the value of exports.

Imports consisted of 276,646,946 pounds of edible products, valued at $28,936,684 and nonedible products, valued at $14,096,705. Fishery exports consisted of 114,334,877 pounds of edible products, valued at $11,380,015 and nonedible products valued at $194,242.

Exports of domestic fishery products, 1931

Item	Quantity	Value
Edible fishery products:		
Fish, fresh, frozen, or packed in ice—		
Salmon ... pounds	3, 989, 224	$533, 696
Other fresh fish ... do	5, 074, 591	421, 370
Total ... do	9, 063, 815	955, 066
Fish, salted or dry cured—		
Cod ... do	1, 021, 290	109, 491
Haddock, hake, and pollock ... do	1, 045, 890	62, 274
Herring ... do	1, 251, 926	70, 943
Salmon ... do	3, 636, 426	375, 129
Other ... do	788, 195	73, 193
Total ... do	7, 743, 727	691, 030
Fish, pickled—		
Salmon ... do	943, 600	197, 866
Other ... do	2, 747, 600	84, 593
Total ... do	3, 691, 200	282, 459
Fish, canned—		
Salmon ... do	24, 221, 633	4, 039, 993
Sardines ... do	53, 246, 898	3, 445, 770
Mackerel ... do	1, 550, 161	111, 218
Other ... do	782, 628	118, 673
Total ... do	79, 801, 320	7, 715, 654
Shellfish—		
Canned ... do	3, 126, 378	565, 340
Not canned ... do	9, 035, 467	1, 033, 689
Total ... do	12, 161, 845	1, 599, 029
Other fish products ... do	1, 872, 970	136, 777
Total edible products ... do	114, 334, 877	11, 380, 015
Nonedible fishery products:		
Marine-animal oils ... do	1, 597, 895	81, 547
Buttons, pearl or shell ... gross	95, 683	27, 306
Sponges ... pounds	68, 036	85, 389
Total		112, 695
Total nonedible products		194, 242
Grand total		11, 574, 257

Imports of fishery products entered for consumption, 1931

Item	Pounds	Value
EDIBLE FISHERY PRODUCTS		
Fish, fresh or frozen:		
Whole, beheaded, or eviscerated or both—		
Salmon	5, 601, 687	$587, 420
Fresh-water fish, not elsewhere specified:		
Yellow pike	7, 462, 927	746, 590
Whitefish	8, 176, 536	823, 854
Tullibees	2, 396, 508	147, 321
Jacks or grass pike	2, 408, 473	104, 896
Lake trout	2, 310, 192	236, 239
Yellow perch	726, 684	44, 861
Lake herring, ciscoes and chubs	2, 319, 104	265, 972
Fresh-water fish, not specially provided for	17, 514, 434	1, 173, 542
Eels	356, 693	26, 746
Cod, haddock, hake, pollock, and cusk	1, 236, 518	63, 373
Halibut:		
Fresh	3, 844, 247	404, 816
Frozen	254, 011	35, 564
Mackerel	1, 825, 846	90, 421
Swordfish	2, 127, 889	207, 417
Sturgeon	3, 434, 942	740, 540
Fish, not specially provided for	2, 561, 405	205, 819
Whether or not whole—		
Smelts	6, 640, 047	840, 349
Tuna fish	7, 857, 846	578, 615
Sea herring—		
Fresh	13, 238, 367	52, 518
Frozen	2, 918, 543	91, 451
Fillets, skinned, boned, sliced, or divided, not specially provided for	3, 008, 143	326, 578
Total	98, 221, 042	7, 794, 902
Fish, salted, dried, smoked, pickled or preserved:		
Dried and unsalted—		
Cod, haddock, hake, pollock, and cusk	2, 400, 218	229, 711
Other	1, 800, 895	286, 932
In oil or in oil and other substances—		
Sardines	29, 417, 669	3, 931, 024
Anchovies	1, 888, 220	560, 410
Antipasto	365, 185	107, 381
Other	1, 648, 765	293, 751
Not in oil or in oil and other substances—		
In air-tight containers weighing with contents, not over 15 pounds each—		
Anchovies	2, 929, 333	269, 134
Salmon	137, 350	12, 653
Herring and sardines	4, 902, 191	426, 971
Fish cakes, balls, and pudding	911, 219	70, 715
Other	1, 467, 195	187, 140
Pickled or salted—		
Not in oil, etc., and not in air-tight containers weighing, with contents, 15 pounds or less each:		
Salmon	640, 593	66, 356
Cod, haddock, hake, pollock, and cusk, neither skinned nor boned (except that vertibral column may be removed)—		
Containing not more than 43 per cent moisture by weight	23, 350, 117	1, 367, 042
Containing more than 43 per cent moisture by weight	13, 467, 714	600, 450
Cod, haddock, hake, pollock, and cusk, skinned or boned	2, 128, 359	197, 579
Herring—		
In bulk or in containers weighing, with contents, more than 15 pounds each (net weight)	41, 562, 791	2, 573, 487
In containers (not air-tight), weighing, with contents, not more than 15 pounds each	32, 552	2, 252
Mackerel—		
In bulk or in containers weighing, with contents, more than 15 pounds each (net weight)	6, 726, 970	312, 742
In containers (not air-tight) weighing, with contents, not more than 15 pounds each	245	88
Pickled or salted, not specially provided for—		
In bulk or in containers weighing, with contents, more than 15 pounds each (net weight)	1, 909, 065	158, 463
In containers (not air-tight) weighing, with contents, not more than 15 pounds each	42, 259	4, 976
Smoked or kippered—		
Not in oil, etc., and not in air-tight containers weighing, with contents, 15 pounds or less each—		
Salmon	4, 278	1, 622
Herring—		
Whole or beheaded	1, 189, 092	59, 350
Eviscerated, split, skinned, boned, or divided	865, 919	81, 483
Cod, haddock, hake, pollock, and cusk—		
Whole, or beheaded, or eviscerated or both	850, 506	78, 208
Filleted, skinned, boned, sliced, or divided	836, 008	96, 140
Smoked or kippered, not specially provided for	143, 814	14, 097

Imports of fishery products entered for consumption, 1931—Continued

Item	Pounds	Value
EDIBLE FISHERY PRODUCTS—continued		
Fish, salted, dried, smoked, pickled or preserved—Continued.		
Fish paste and fish sauce	67, 288	$21, 978
Prepared or preserved, not specially provided for—		
In containers weighing, with contents, not more than 15 pounds each	378, 642	49, 703
In bulk or in containers weighing, with contents, more than 15 pounds each (net weight)	80, 437	9, 538
Total	142, 144, 889	12, 071, 376
Caviar and other fish roe:		
Not boiled, etc.—		
Sturgeon	352, 255	456, 019
Fish roe, not specially provided for	91, 313	18, 124
Boiled, packed in air-tight containers	81, 073	9, 172
Total	524, 641	483, 315
Shellfish:		
Crab meat, crab sauce, and crab paste	11, 426, 096	4, 430, 721
Clams, clam juice, or either in combination with other substances, in air-tight containers	1, 056, 296	154, 088
Oysters, oyster juice, or either in combination with other substances, in air-tight containers	124, 617	24, 130
Lobsters (including spiny lobsters and crawfish)—		
Not canned	9, 983, 824	2, 171, 337
Canned	1, 702, 721	820, 144
Clams not in air-tight containers	3, 144, 295	64, 699
Shrimp and prawn	1, 077, 704	151, 509
Scallops	153, 427	24, 382
Oysters, not in air-tight containers	2, 269, 509	133, 203
Shellfish, not specially provided for	4, 140, 719	569, 360
Pastes and sauces of shellfish, not specially provided for	126, 226	9, 522
Crabs	35, 906	2, 692
Turtles	515, 034	31, 304
Total	35, 756, 374	8, 587, 091
Total edible fishery products	276, 646, 946	28, 936, 684
NONEDIBLE FISHERY PRODUCTS	*Quantity*	
Marine-animal oils:		
Cod oil gallons	1, 794, 359	610, 126
Cod-liver oil do	1, 737, 207	1, 311, 831
Eulachon oil do	1, 375	688
Herring oil do	4, 243, 420	1, 219, 419
Menhaden and sod oil do	91, 563	23, 888
Seal oil do	79, 870	24, 741
Whale oil—		
Sperm, crude do	327, 115	110, 010
Sperm, refined or otherwise processed do	46, 107	17, 466
Whale oil, not specially provided for do	10, 826, 250	4, 815, 690
Total	19, 147, 266	8, 133, 859
Pearls and imitation pearls:		
Pearls and parts, not strung or set		1, 281, 019
Imitation pearls—		
Half pearls and hollow or filled		17, 114
Solid pearls, not elsewhere specified:		
Valued at not more than one-fourth cent an inch inches	1, 661, 234	1, 891
Valued at more than one-fourth cent and not more than 1 cent an inch inches	246, 470	1, 534
Iridescent solid pearls:		
Valued at not more than 10 cents per inch do	41, 102	226
Valued at more than 10 cents per inch do	90	12
Total		1, 301, 796
Shells and buttons of pearl or shell:		
Shells, unmanufactured—		
Green snail shell pounds	114, 521	13, 620
Mother-of-pearl do	4, 438, 168	1, 298, 615
Shells, not specially provided for do	2, 719, 310	71, 234
Shells and mother-of-pearl, engraved, cut, ornamented, or manufactured		22, 205
Shell pearl buttons—		
Ocean or trochus gross	131, 543	56, 105
Buttons (from Philippine Islands) do	849, 009	384, 743
Total		1, 846, 522

Imports of fishery products entered for consumption, 1931—Continued

Item	Quantity	Value
NONEDIBLE FISHERY PRODUCTS—continued		
Sponges:		
Sheepswool pounds	208, 539	$425, 384
Yellow, grass, or velvet do	324, 728	154, 875
Other do	38, 904	83, 263
Manufactures of do	2, 557	1, 071
Total	574, 728	664, 593
Agar-agar pounds	469, 335	304, 466
Ambergris do	7	1, 940
Cod-liver oil cake and cod-liver oil cake meal do	944, 856	30, 195
Cuttlefish bone do	432, 970	57, 361
Goldfish, live number	1, 518, 641	20, 306
Fish for other than human consumption		56, 698
Fish sounds pounds	97, 766	17, 509
Fish scrap and fish meal tons	38, 447	1, 351, 842
Skins, fish, raw or salted pounds	131, 904	13, 453
Skins, seal, raw (not fur skins) do	2, 208, 166	292, 813
Spermaceti wax do	24, 261	2, 767
Whalebone, unmanufactured do	14	31
Whalebone, manufactures of		554
Total		2, 149, 935
Total nonedible fishery products		14, 096, 705
Grand total		43, 033, 389

FISHERIES OF THE NEW ENGLAND STATES [4]

The yield of fishery products in the New England States during 1930 amounted to 701,350,979 pounds, valued at $27,493,479. This is an increase of 1 per cent in the volume of the catch, but a decrease of 5 per cent in its value as compared with the catch in the previous year. Of the total catch in 1930, 645,574,206 pounds, valued at $19,232,205 were fish, and 55,776,773 pounds, valued at $8,261,274 were shellfish and miscellaneous products. These fisheries gave employment to 17,077 fishermen which is a decrease of less than one-half of 1 per cent as compared with the number of fishermen in 1929. Of the total number of fishermen employed during 1930, 6,192 regular fishermen were engaged on vessels and 7,961 regular and 2,924 casual fishermen were employed in the boat and shore fisheries.

Fisheries of the New England States, 1930

SUMMARY OF CATCH

Product	Maine		New Hampshire		Massachusetts	
	Pounds	Value	Pounds	Value	Pounds	Value
Fish	124, 465, 169	$1, 828, 711	888, 490	$28, 781	427, 521, 214	$14, 030, 256
Shellfish, etc	19, 358, 465	2, 500, 695	180, 587	40, 363	14, 952, 751	2, 258, 822
Total	143, 823, 634	4, 329, 406	1, 069, 077	69, 144	442, 473, 965	16, 289, 078

Product	Rhode Island		Connecticut		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Fish	16, 935, 860	$699, 748	75, 763, 473	$2, 644, 709	645, 574, 206	$19, 232, 205
Shellfish, etc	9, 036, 033	1, 587, 522	12, 248, 937	1, 873, 872	55, 776, 773	8, 261, 274
Total	25, 971, 893	2, 287, 270	88, 012, 410	4, 518, 581	701, 350, 979	27, 493, 479

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[4] With reference to the figures published in this section the reader should refer to that section in the latter part of the book entitled "Statistical survey procedure" which gives in detail methods for collecting statistics, compilation practices, and conversion factors. This is most necessary for a complete understanding of the statistics presented herewith.

Fisheries of the New England States, 1930—Continued

OPERATING UNITS: BY STATES

Item	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels	439	---	4,445	356	952	6,192
On boats and shore—						
Regular	3,760	46	2,859	870	426	7,961
Casual	952	40	1,377	403	152	2,924
Total	5,151	86	8,681	1,629	1,530	17,077
Vessels:						
Steam	---	---	22	9	33	64
Net tonnage	---	---	3,291	265	5,477	9,033
Motor	78	---	395	74	102	649
Net tonnage	962	---	15,384	747	1,490	18,583
Sail	1	---	1	---	3	5
Net tonnage	19	---	6	---	25	50
Total vessels	79	---	418	83	138	718
Total net tonnage	981	---	18,681	1,012	6,992	27,666
Boats:						
Motor	2,166	38	1,669	578	237	4,688
Other	1,726	5	1,477	673	218	4,099
Accessory boats	189	---	979	160	62	1,373
Apparatus:						
Purse seines—						
Mackerel	31	2	105	4	9	151
Length, yards	7,994	500	50,098	560	1,620	60,772
Menhaden	---	---	---	---	2	2
Length, yards	---	---	---	---	720	720
Other	28	---	3	1	---	32
Length, yards	6,724	---	410	320	---	7,454
Haul seines	78	1	13	27	28	147
Length, yards	10,026	100	2,225	3,100	2,710	18,161
Gill nets—						
Anchor	1,415	---	2,034	---	32	3,481
Square yards	209,750	---	653,340	---	5,370	868,460
Drift	74	---	9,461	161	230	9,926
Square yards	11,681	---	3,286,236	59,640	22,770	3,380,327
Runaround	---	---	---	12	---	12
Square yards	---	---	---	24,100	---	24,100
Stake	105	---	---	---	---	105
Square yards	4,725	---	---	---	---	4,725
Lines—						
Hand	4,375	160	583	432	288	5,838
Hooks	4,403	160	849	587	297	6,296
Trawl	33,050	3,600	54,956	1,193	1,726	94,525
Hooks	1,629,100	180,000	2,730,464	56,550	84,380	4,680,494
Pound nets	---	---	136	62	11	209
Floating traps	25	---	19	62	8	114
Weirs	213	---	6	---	---	219
Fyke nets	59	---	52	40	107	258
Dip nets	104	---	61	17	---	182
Bag nets	165	---	---	---	---	165
Push nets	---	---	53	---	---	53
Pocket nets	17	---	---	---	---	17
Otter trawls	36	---	331	66	132	565
Yards at mouth	1,117	---	9,750	1,824	3,274	15,965
Box traps	10	---	1	4	---	15
Pots—						
Crab	1,635	---	1,735	---	160	3,530
Eel	440	---	1,782	2,015	808	5,045
Lobster	205,302	2,570	69,249	39,165	16,505	332,791
Periwinkle and cockle	---	---	1,012	875	---	1,887
Harpoons, swordfish	44	2	107	49	19	221
Spears	41	---	201	37	40	319
Dredges—						
Oyster	---	---	26	32	242	300
Yards at mouth	---	---	27	49	241	317
Scallop	113	---	2,877	532	---	3,522
Yards at mouth	157	---	2,337	414	---	2,908
Clam	---	---	78	6	---	84
Yards at mouth	---	---	40	4	---	44
Tongs	---	---	183	523	144	850
Rakes	---	---	552	156	30	738
Forks	1,598	---	538	13	64	2,213
Hoes	16	---	610	10	6	642

Fisheries of the New England States, 1930—Continued

CATCH: BY STATES

Species	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH												
Albacore							34, 759	$703			34, 759	$703
Alewives	2, 129, 495	$17, 369			1, 789, 846	$17, 630	186, 050	1, 693	1, 000	$30	4, 106, 391	36, 722
Bluefish	200	19			210, 307	20, 752	243, 295	29, 516	251, 651	32, 670	705, 453	82, 957
Bonito					82, 417	6, 519	57, 439	4, 221	116	13	139, 972	10, 753
Butterfish	112, 140	14, 891			855, 113	72, 167	901, 120	48, 717	36, 179	3, 773	1, 904, 552	139, 548
Carp					2, 976	59			17, 995	1, 946	20, 971	2, 005
Catfish and bullheads	15, 425	158			102, 125	2, 382					117, 550	2, 540
Cod	13, 483, 964	356, 731	157, 800	$3, 945	77, 522, 224	2, 358, 348	1, 552, 952	64, 819	8, 915, 229	259, 169	101, 632, 169	3, 043, 012
Croaker					140, 005	5, 600			10, 780	434	150, 785	6, 034
Cunners					18, 735	574	87, 600	2, 496			106, 335	3, 070
Cusk	1, 353, 983	28, 555	7, 890	117	4, 713, 076	103, 549			65, 241	960	6, 140, 190	133, 181
Dolphin									138	8	138	8
Eels	241, 975	22, 213			479, 065	44, 466	495, 152	47, 234	138, 729	18, 007	1, 354, 921	131, 920
Flounders	1, 949, 966	88, 889	15, 780	473	31, 334, 909	1, 262, 638	4, 700, 571	146, 972	11, 164, 206	364, 478	49, 165, 432	1, 863, 450
Frigate mackerel					384, 661	17, 921					384, 661	17, 921
Goosefish					200	3					200	3
Grayfish					84, 296	2, 882	8, 900	167			93, 196	3, 049
Haddock	12, 508, 138	371, 773	394, 000	15, 780	202, 687, 789	6, 441, 249	886, 328	30, 121	48, 072, 674	1, 672, 619	264, 548, 929	8, 531, 542
Hake	11, 685, 397	116, 335	78, 900	1, 174	19, 240, 569	412, 058	62, 860	1, 724	1, 137, 702	25, 212	32, 205, 428	556, 503
Halibut	103, 344	17, 708	300	45	2, 880, 444	445, 638			182, 910	33, 472	3, 166, 998	496, 863
Herring, sea	73, 938, 780	385, 712	60, 000	450	8, 687, 049	113, 467	214, 711	3, 067			82, 900, 540	502, 696
Hickory shad							4, 049	85			4, 049	85
King whiting or "kingfish"					200	21					200	21
Launce					182, 926	4, 384					182, 926	4, 384
Mackerel	3, 012, 157	118, 038	100, 000	4, 000	45, 531, 276	1, 569, 658	1, 411, 571	51, 656	615, 626	24, 366	50, 700, 630	1, 767, 718
Menhaden							132, 160	1, 039	1, 575, 660	15, 862	1, 707, 820	16, 901
Minnows					6, 000	1, 200			30, 035	2, 722	36, 035	3, 922
Mullet							8, 392	298			8, 392	298
Mummichog									7, 134	713	7, 134	713
Pike or pickerel									275	41	275	41
Pollock	2, 045, 142	28, 616	39, 450	562	15, 014, 676	261, 472	174, 926	2, 495	545, 366	12, 519	17, 819, 560	305, 664
Rosefish	3, 845	34			109, 857	2, 189			3, 528	25	117, 230	2, 248
Salmon	88, 295	27, 265			55	10					88, 350	27, 275
Scup or porgy					792, 008	35, 798	1, 645, 590	76, 273	285, 452	5, 697	2, 723, 050	117, 768
Sea bass					141, 587	9, 377	35, 734	2, 161	14, 253	2, 103	191, 574	13, 641
Sea robin					100	1	193, 928	2, 360	41, 056	207	235, 084	2, 568
Shad	88, 635	1, 801			54, 149	2, 941	4, 303	701	53, 942	10, 095	201, 029	15, 538

Sharks	41,010	1,039	-	-	49,069	976	12,980	216	-	-	103,059	2,231
Skates	-	-	-	-	51,803	816	680,350	6,517	283,833	2,352	1,015,986	9,685
Skipper or "billfish"	-	-	-	-	-	-	6,068	1,248	-	-	6,068	1,248
Smelt	720,708	126,399	8,000	1,600	6,250	2,719	50,975	7,680	9,900	2,123	795,833	140,521
Spearfish	94	11	-	-	-	-	-	-	-	-	94	11
Squeteagues or "sea trout":												
Gray	-	-	-	-	1,238	149	141,145	15,416	43,252	3,822	185,635	19,387
Spotted	-	-	-	-	1,246	221	-	-	-	-	1,246	221
Striped bass	-	-	-	-	27,385	6,099	59,817	10,870	1,638	185	88,840	17,154
Sturgeon	440	66	-	-	7,745	1,015	1,234	197	-	-	9,419	1,278
Suckers	36,859	2,949	-	-	-	-	7,600	152	69,020	5,263	113,479	8,364
Swordfish	572,519	93,214	-	-	3,728,333	657,593	609,899	90,109	224,296	35,668	5,135,047	876,584
Tautog	-	-	-	-	109,710	6,758	309,635	15,142	135,545	10,087	554,890	31,987
Tilefish	-	-	-	-	-	-	-	-	1,783,456	97,068	1,783,456	97,068
Tomcod	51,252	897	-	-	-	-	22,600	302	200	60	74,052	1,259
Tuna or "horse-mackerel"	140,918	6,873	2,700	162	66,066	5,223	24,180	1,901	5,400	324	239,264	14,483
White perch	-	-	-	-	450	45	49,700	5,038	-	-	50,150	5,083
Whiting	40,630	228	-	-	7,902,288	81,719	1,917,287	26,442	2,500	10	9,862,705	108,399
Wolffish	69,470	883	23,670	473	2,520,991	51,970	-	-	36,856	501	2,650,987	53,827
Yellow perch	388	45	-	-	-	-	-	-	700	105	1,088	150
Total	124,465,169	1,828,711	888,490	28,781	427,521,214	14,030,256	16,935,860	699,748	75,763,473	2,644,709	645,574,206	19,232,205
SHELLFISH, ETC.												
Crabs, hard	1,123,353	33,780	-	-	458,298	86,280	166,562	5,256	203,528	4,056	1,951,741	129,372
Lobsters	7,750,682	2,007,343	180,587	40,363	2,338,234	625,946	1,353,107	313,550	734,712	230,266	12,357,322	3,217,468
Shrimp	-	-	-	-	4,800	3,600	-	-	-	-	4,800	3,600
Squid	119,140	1,185	-	-	3,830,006	68,922	1,545,902	41,876	10,700	225	5,505,748	112,208
Clams:												
Cockle	4,206	210	-	-	24,570	4,715	-	-	-	-	28,776	4,925
Hard, public [1]	-	-	-	-	1,889,704	477,010	1,626,427	317,874	17,428	8,584	3,533,559	803,468
Hard, private [1]	-	-	-	-	66,000	7,149	222,448	47,505	-	-	288,448	54,654
Razor	-	-	-	-	380,266	20,476	-	-	-	-	380,266	20,476
Soft, public [2]	9,648,588	341,612	-	-	3,273,652	275,934	28,440	6,442	71,730	12,989	13,022,410	636,977
Soft, private [2]	276,080	7,364	-	-	-	-	-	-	-	-	276,080	7,364
Surf or skimmer	-	-	-	-	38,275	3,750	-	-	-	-	38,275	3,750
Mussels, sea	-	-	-	-	10,800	2,100	-	-	-	-	10,800	2,100
Oysters:												
Market, public, spring [3]	-	-	-	-	770	200	8,944	2,650	5,135	1,745	14,849	4,595
Market, public, fall [3]	-	-	-	-	-	-	9,079	2,670	21,741	3,825	30,820	6,495
Market, private, spring [3]	-	-	-	-	222,175	100,411	1,531,592	339,887	3,032,230	423,439	4,785,997	863,737
Market, private, fall [3]	-	-	-	-	211,569	90,039	1,832,128	392,709	2,556,605	389,525	4,600,302	872,273

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[1] Statistics on hard clams used in this table are based on yields of 11 pounds of meats per bushel in Massachusetts and Rhode Island, and 8 pounds in Connecticut. In reports for previous years all hard clams in these States have been computed on the basis of a uniform yield of 8 pounds of meats to the bushel.

[2] Statistics on soft clams used in this table are based on yields of 17 pounds of meats per bushel in Maine, Massachusetts, and Rhode Island; and 15 pounds in Connecticut. In reports for previous years, all soft clams in these States have been computed on the basis of a uniform yield of 10 pounds of meats to the bushel.

[3] Statistics on market oysters used in this table are based on yields of 8.8 pounds of meats per bushel in Massachusetts, 8 pounds in Rhode Island, and 7.5 pounds in Connecticut. In reports for previous years, all market oysters have been computed on the basis of a uniform yield of 7 pounds of meats to the bushel.

Fisheries of the New England States, 1930—Continued

CATCH: BY STATES—Continued

Species	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
SHELLFISH, ETC.—continued												
Oysters—Continued.												
Seed, public, spring [4]							6, 023	$1, 002	518, 805	$72, 405	524, 828	$73, 407
Seed, public, fall [4]					31, 500	$2, 250	361	47	805, 406	92, 308	837, 267	94, 605
Seed, private, spring [4]					115, 808	6, 886	298, 500	40, 750	3, 709, 741	556, 963	4, 124, 049	604, 599
Seed, private, fall [4]									561, 176	77, 542	561, 176	77, 542
Periwinkles					17, 442	3, 887	312, 210	34, 680			329, 652	38, 567
Scallops:												
Bay					1, 435, 144	396, 565	94, 310	40, 624			1, 529, 454	437, 189
Sea	436, 416	$109, 201			510, 738	77, 122					947, 154	186, 323
Irish moss					93, 000	5, 580					93, 000	5, 580
Total	19, 358, 465	2, 500, 695	180, 587	$40, 363	14, 952, 751	2, 258, 822	9, 036, 033	1, 587, 522	12, 248, 937	1, 873, 872	55, 776, 773	8, 261, 274
Grand total	143, 823, 634	4, 329, 406	1, 069, 077	69, 144	442, 473, 965	16, 289, 078	25, 971, 893	2, 287, 270	88, 012, 410	4, 518, 581	701, 350, 979	27, 493, 479

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[4] Statistics on seed oysters, public and private, used in this table are based on yields of 7 pounds of meats to the bushel, the same as in previous reports.

Fisheries of the New England States, 1930—Continued

PRODUCTION OF CERTAIN SHELLFISH IN NUMBERS AND BUSHELS

Product	Maine		Massachusetts		Rhode Island		Connecticut		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Crabs, hard..number..	3, 370, 058	$33, 780	1, 374, 894	$86, 280	499, 686	$5, 256	610, 584	$4, 056	5, 855, 223	$129, 372
Clams:										
Cockle....bushels..	421	210	1, 365	4, 715	-------	-------	-------	-------	1, 786	4, 925
Hard, public..do....	-------	-------	17, 791	477, 010	147, 857	317, 874	2, 179	8, 584	321, 827	803, 468
Hard, private ....do....	-------	-------	6, 000	7, 149	20, 223	47, 505	-------	-------	26, 223	54, 654
Razor.........do....	-------	-------	7, 042	20, 476	-------	-------	-------	-------	7, 042	20, 476
Soft, public..do....	567, 564	341, 612	192, 568	275, 934	1, 673	6, 442	4, 782	12, 989	766, 587	636, 977
Soft, private..do...	16, 240	7, 364	-------	-------	-------	-------	-------	-------	16, 240	7, 364
Surf or skimmer ....bushels..	-------	-------	3, 190	3, 750	-------	-------	-------	-------	3, 190	3, 750
Mussels..........do....	-------	-------	1, 080	2, 100	-------	-------	-------	-------	1, 080	2, 100
Oysters:										
Market, public, spring..bushels..	-------	-------	88	200	1, 118	2, 650	685	1, 745	1, 891	4, 595
Market, public, fall ....bushels..	-------	-------	-------	-------	1, 135	2, 670	2, 900	3, 825	4, 035	6, 495
Market, private, spring..bushels..	-------	-------	25, 247	100, 411	191, 449	339, 887	404, 459	423, 439	621, 155	863, 737
Market, private, fall......bushels..	-------	-------	24, 042	90, 039	229, 016	392, 709	341, 017	389, 525	594, 075	872, 273
Seed, public, spring ....bushels..	-------	-------	-------	-------	860	1, 002	74, 115	72, 405	74, 975	73, 407
Seed, public, fall ....bushels..	-------	-------	4, 500	2, 250	52	47	115, 058	92, 308	119, 610	94, 605
Seed, private, spring..bushels..	-------	-------	16, 544	6, 886	42, 643	40, 750	529, 963	556, 963	589, 150	604, 599
Seed, private, fall ....bushels..	-------	-------	-------	-------	-------	-------	80, 168	77, 542	80, 168	77, 542
Periwinkles......do....	-------	-------	969	3, 887	17, 345	34, 680	-------	-------	18, 314	38, 567
Scallops:										
Bay..........do....	-------	-------	239, 191	396, 565	15, 718	40, 624	-------	-------	254, 909	437, 189
Sea..........do....	72, 736	109, 201	85, 123	77, 122	-------	-------	-------	-------	157, 859	186, 323

Industries related to the fisheries of the New England States, 1930

Item	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
Transporting:						
Persons engaged—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels..........	239	3	30	19	72	363
On boats..........	1	-------	-------	-------	-------	1
Total..........	240	3	30	19	72	364
Vessels—						
Steam..........	-------	-------	-------	-------	3	3
Net tonnage..........	-------	-------	-------	-------	150	150
Motor..........	115	1	12	6	13	147
Net tonnage..........	1, 260	16	199	55	305	1, 835
Total vessels..........	115	1	12	6	16	150
Total net tonnage..	1, 260	16	199	55	455	1, 985
Boats..........	1	-------	-------	-------	-------	1
Wholesale and manufacturing—						
Establishments..........	187	3	193	34	33	450
Persons engaged—						
Proprietors..........	214	5	77	28	40	364
Salaried employees..........	155	-------	762	58	53	1, 028
Wage earners—						
Average for season...	5, 888	9	2, 734	328	903	9, 862
Average for year.....	1, 814	8	2, 429	218	694	5, 163
Salaries and wages paid......	$1, 822, 209	$17, 780	$5, 192, 823	$372, 328	$1, 050, 320	$8, 455, 460
Manufactured products[1].....	$6, 877, 816	(2)	$15, 869, 420	$1, 291, 225	$2, 716, 889	$26, 755, 350
Fishermen's manufactured products:						
Persons engaged..........	355	-------	3, 325	467	-------	4, 147
Products..........	$133, 956	-------	$691, 678	$37, 331	-------	$862, 965

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[1] These production figures are not comparable with those shown in previous bulletins since packaged fresh and frozen fishery products are now included.

[2] Included with Maine.

NOTE.—Of the total number of persons employed on transporting craft, 8 have also been included as fishermen, and among the total persons engaged in the preparation of fishermen's manufactured products, 2,950 have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

MAINE

Fisheries of Maine, 1930

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets			Lines		Floating traps
	Mackerel	Other		Anchor	Drift	Stake	Hand	Trawl	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	97	95	2	37	6	------	12	190	------
On boats and shore—									
Regular	38	19	164	136	8	------	532	839	32
Casual	------	------	3	59	7	5	686	------	3
Total	135	114	169	232	21	5	1, 230	1, 029	35
Vessels:									
Motor—									
5 to 10 tons	9	16	1	5	------	------	5	8	------
11 to 20 tons	5	5	------	2	------	------	------	7	------
21 to 30 tons	------	1	------	------	------	------	------	2	------
31 to 40 tons	1	------	------	------	------	------	------	2	------
41 to 50 tons	------	1	------	------	------	------	------	------	------
51 to 60 tons	------	------	------	------	------	------	------	2	------
Total	15	23	1	7	------	------	5	21	------
Net tonnage	174	242	9	67	------	------	32	410	------
Sail—									
10 to 20 tons	1	------	------	------	1	------	------	1	------
Net tonnage	19	------	------	------	19	------	------	19	------
Total vessels	16	23	1	7	1	------	5	22	------
Total net tonnage	193	242	9	67	19	------	32	429	------
Boats:									
Motor	14	5	77	71	4	1	303	581	17
Other	14	6	79	59	4	5	157	162	3
Accessory boats	22	29	1	------	------	------	1	138	------
Apparatus:									
Number	31	28	78	1, 415	74	105	4, 375	33, 050	25
Length, yards	7, 994	6, 724	10, 026	------	------	------	------	------	------
Square yards	------	------	------	209, 750	11, 681	4, 725	------	------	------
Hooks, baits, or snoods	------	------	------	------	------	------	4, 403	1, 629, 100	------

Item	Weirs	Fyke nets	Dip nets	Bag nets	Pocket nets	Otter trawls	Box traps	Pots		
								Crab	Eel	Lobster
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	------	------	------	------	------	39	------	------	------	10
On boats or shore—										
Regular	246	------	6	33	------	61	------	37	13	2, 138
Casual	83	13	98	60	6	------	10	------	11	2
Total	329	13	104	93	6	100	10	37	24	2, 150
Vessels:										
Motor—										
5 to 10 tons	------	------	------	------	------	7	------	------	------	5
11 to 20 tons	------	------	------	------	------	3	------	------	------	------
Total	------	------	------	------	------	10	------	------	------	5
Net tonnage	------	------	------	------	------	92	------	------	------	27
Boats:										
Motor	136	1	------	15	2	30	------	28	2	1, 804
Other	182	12	------	58	4	4	2	10	22	849
Apparatus:										
Number	213	59	104	165	17	36	10	1, 635	440	205, 302
Yards at mouth	------	------	------	------	------	1, 117	------	------	------	------

Fisheries of Maine, 1930—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Harpoons, swordfish	Spears	Dredges, scallop	Forks	Hoes	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	179		21				439
On boats and shore—							
Regular	54	4	109	1,605	16		3,760
Casual		37		28		1	952
Total	233	41	130	1,633	16	1	5,151
Vessels:							
Motor—							
5 to 10 tons	3		5				49
11 to 20 tons	7		2				21
21 to 30 tons	2						3
31 to 40 tons	2						2
41 to 50 tons							1
51 to 60 tons	2						2
Total	16		7				78
Net tonnage	374		65				962
Sail—							
10 to 20 tons	1						1
Net tonnage	19						19
Total vessels	17		7				79
Total net tonnage	393		65				981
Boats:							
Motor	27	1	94	224			2,166
Other		40	7	581	3		1,726
Accessory boats	14						189
Apparatus:							
Number	44	41	113	1,598	16		248,974
Yards at mouth			157				

CATCH: BY GEAR

Species	Purse seines				Haul seines		Gill nets			
	Mackerel		Other				Anchor		Drift	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	135,000	$4,000					47,516	$660		
Butterfish	1,300	39								
Cod							2,996,823	93,208		
Cusk							17,890	354		
Flounders							4,992	97		
Haddock							910,435	23,931		
Hake							334,677	6,054		
Halibut							238	29		
Herring, sea	6,381,032	62,546	32,602,280	$169,471	2,561,391	$13,873	3,065	61	25,000	$214
Mackerel	1,900,205	74,198	150,000	7,200			349,900	14,140	89,462	3,282
Pollock	143	3	65,810	658			986,627	14,387		
Salmon	43	7					15,152	4,826	600	180
Shad	54,026	816	1,500	30			1,720	121	29,800	808
Sharks							34,189	871		
Smelts	2,500	375			268,770	44,343	82,797	15,851		
Sturgeon							190	16	250	50
Tomcod					11,252	297				
Whiting	12,000	60								
Wolffish							67	1		
Lobsters							36	15		
Total	8,486,249	142,044	32,819,590	177,359	2,841,413	58,513	5,786,314	174,622	145,112	4,534

Fisheries of Maine, 1930—Continued

CATCH: BY GEAR—Continued

Species	Gill nets—Stake		Lines				Floating traps		Weirs	
			Hand		Trawl					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives									630, 833	$5, 650
Bluefish							200	$19		
Butterfish							110, 840	14, 852		
Catfish and bullheads					15, 425	$158				
Cod			1, 796, 906	$41, 085	7, 905, 720	202, 487				
Cusk			16, 975	173	1, 312, 165	27, 957				
Eels					15, 640	1, 564				
Flounders					57, 739	1, 578				
Haddock			1, 250, 936	32, 705	9, 500, 613	294, 998				
Hake			1, 250, 419	12, 061	9, 833, 249	95, 654				
Halibut			15, 647	2, 729	87, 330	14, 929				
Herring, sea							1, 474, 000	9, 766	30, 892, 012	129, 781
Mackerel							546, 590	18, 918	6, 000	300
Pollock			498, 713	6, 513	493, 255	7, 046				
Rosefish					3, 845	34				
Salmon	9, 000	$2, 700					8, 958	2, 381	50, 512	15, 760
Shad							1, 589	26		
Sharks					5, 121	123	1, 500	41		
Smelts	7, 334	1, 100	207, 270	38, 392			150	23	6, 124	1, 144
Whiting							28, 630	168		
Wolffish					67, 447	861				
Squid							119, 140	1, 185		
Total	16, 334	3, 800	5, 036, 866	133, 658	29, 297, 549	647, 389	2, 291, 597	47, 379	31, 585, 481	152, 635

Species	Fyke nets		Dip nets		Bag nets		Pocket nets		Otter trawls	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			1, 316, 146	$7, 059						
Cod									784, 515	$19, 951
Cusk									6, 953	71
Eels	1, 595	$160	8, 640	864					8, 000	240
Flounders									1, 887, 235	87, 214
Haddock									846, 154	20, 139
Hake									267, 052	2, 566
Halibut									129	21
Pollock									594	9
Salmon			4, 030	1, 411						
Sharks									200	4
Smelts			19, 000	2, 900	125, 213	$21, 978	1, 550	$293		
Suckers	36, 859	2, 949								
Tomcod					40, 000	600				
Wolffish									1, 956	21
Yellow perch	388	45								
Total	38, 842	3, 154	1, 347, 816	12, 234	165, 213	22, 578	1, 550	293	3, 802, 788	130, 236

Species	Box traps		Pots						Harpoons, swordfish	
			Crab		Eel		Lobster			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels	31, 875	$4, 232			139, 680	$10, 442				
Spearfish									94	$11
Swordfish									572, 519	93, 214
Tuna or "horse mackerel"									140, 918	6, 873
Crabs, hard			991, 353	$29, 390			132, 000	$4, 390		
Lobsters			14, 771	4, 654			7, 735, 875	2, 002, 674		
Total	31, 875	4, 232	1, 006, 124	34, 044	139, 680	10, 442	7, 867, 875	2, 007, 064	713, 531	100, 098

Species	Spears		Dredges, scallop		Forks		Hoes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels	36, 545	4, 711								
Clams:										
Cockle									4, 206	$210
Soft, public					9, 457, 338	$334, 862	191, 250	$6, 750		
Soft, private					276, 080	7, 364				
Scallops, sea			436, 416	$109, 201						
Total	36, 545	4, 711	436, 416	109, 201	9, 733, 418	342, 226	191, 250	6, 750	4, 206	210

Fisheries of Maine, 1930—Continued

OPERATING UNITS: BY COUNTIES

Item	Cumberland	Hancock	Kennebec	Knox	Lincoln	Penobscot	Sagadahoc	Waldo	Washington	York
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	256	15		89	48				23	8
On boats and shore—										
Regular	603	930		606	400		145	23	866	187
Casual		251	2	133	177	15	208	85	81	
Total	859	1, 196	2	828	625	15	353	108	970	195
Vessels:										
Motor—										
5 to 10 tons	14	5		19	7				3	1
11 to 20 tons	12			5	2				1	1
21 to 30 tons	2								1	
31 to 40 tons	2									
41 to 50 tons									1	
51 to 60 tons	2									
Total	32	5		24	9				6	2
Net tonnage	529	31		202	78				102	20
Sail—10 to 20 tons	1									
Net tonnage	19									
Total vessels	33	5		24	9				6	2
Total net tonnage	548	31		202	78				102	20
Boats:										
Motor	324	526	1	438	206	1	57	18	500	95
Other	163	551	1	126	119	14	66	42	594	50
Accessory boats	140	1		24	12				9	3
Apparatus:										
Purse seines—										
Mackerel	9			7	14					1
Length, yards	2, 215			2, 400	3, 155					224
Other	6	4		7	4		1		6	
Length, yards	870	922		1, 412	970		140		2, 410	
Haul seines	36	7		16	10		6		2	1
Length, yards	3, 380	1, 226		1, 980	1, 540		600		1, 200	100
Gill nets—										
Anchor	412	32		53	315	91	6	44	281	181
Square yards	67, 220	8, 920		14, 190	50, 240	3, [illegible]	1, 080	1, 919	34, 756	27, 910
Drift	45	2			4	1	2			20
Square yards	6, 840	640			461	300	240			3, 200
Stake		4				101				
Square yards		240				4, 485				
Lines—										
Hand	78	1, 933		560	732		825	80	167	
Hooks	88	1, 951		560	732		825	80	167	
Trawl	10, 210	8, 250		6, 860	1, 910		1, 350	40	3, 010	1, 420
Hooks	510, 500	412, 500		339, 400	95, 500		67, 500	2, 000	129, 700	72, 000
Floating traps	11				2		9	3		
Weirs		74		17	4	4	3	18	93	
Fyke nets			18		21		20			
Dip nets		9		7	15		2	30	41	
Bag nets		29				6	5	44	81	
Pocket nets							7		10	
Otter trawls	14	15		6	1					
Yards at mouth	363	571		150	33					
Box traps		3		3	1				3	
Pots—										
Crab	865			60	210				500	
Eel	75	60		20		10	75	55		145
Lobster	23, 104	51, 774		49, 556	22, 616		3, 213	440	47, 644	6, 955
Harpoons, swordfish	28			1	4		8			3
Spears		2		15	5		12		3	4
Dredges, scallop	10	64		23					16	
Yards at mouth	13	84		43					17	
Forks	271	451		149	191		79	12	355	90
Hoes									16	

Fisheries of Maine, 1930—Continued

CATCH: By counties

Species	Cumberland		Hancock		Kennebec	
	Pounds	Value	Pounds	Value	Pounds	Value
Alewives			501, 016	$3, 878		
Bluefish	200	$19				
Butterfish	26, 540	2, 606				
Catfish and bullheads	15, 425	158				
Cod	4, 316, 774	142, 726	3, 302, 790	69, 408		
Cusk	860, 739	19, 947	140, 517	1, 700		
Eels	23, 000	1, 740	30, 075	2, 208	1, 520	$152
Flounders	442, 043	11, 048	872, 249	58, 577		
Haddock	4, 911, 785	171, 963	2, 337, 586	50, 559		
Hake	2, 741, 367	44, 739	5, 543, 920	38, 791		
Halibut	19, 203	3, 263	29, 308	4, 865		
Herring, sea	12, 795, 175	80, 107	10, 440, 248	44, 666		
Mackerel	1, 120, 486	36, 706				
Pollock	1, 223, 166	17, 548	342, 832	3, 980		
Rosefish	3, 845	34				
Salmon	1, 971	418	35, 092	11, 128		
Shad	60, 604	978				
Sharks	41, 010	1, 039				
Smelts	92, 467	14, 321	170, 443	34, 374		
Spearfish	94	11				
Sturgeon	190	16				
Suckers					21, 314	1, 705
Swordfish	571, 853	93, 134				
Tomcod	11, 252	297				
Tuna or "horse mackerel"	59, 511	2, 656				
Whiting	28, 630	168				
Wolffish	51, 710	686				
Crabs, hard	766, 853	22, 961	1, 000	10		
Lobsters	1, 051, 067	298, 211	1, 915, 824	474, 327		
Squid	34, 040	340				
Clams:						
Soft, public	1, 741, 208	96, 683	2, 425, 084	59, 865		
Soft, private			19, 040	560		
Scallops, sea	4, 800	1, 800	135, 798	52, 292		
Total	33, 017, 008	1, 066, 323	28, 242, 822	911, 188	22, 834	1, 857

Species	Knox		Lincoln		Penobscot	
	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	577, 716	$3, 091	750, 500	$7, 978		
Butterfish			10, 600	1, 060		
Cod	2, 267, 003	51, 340	1, 171, 903	27, 975		
Cusk	130, 165	2, 804	111, 851	2, 197		
Eels	24, 700	3, 445	3, 400	336	200	$17
Flounders	596, 315	17, 458	37, 018	1, 736		
Haddock	2, 734, 758	79, 924	684, 145	17, 602		
Hake	1, 712, 896	15, 932	864, 102	8, 661		
Halibut	14, 839	2, 533	6, 663	1, 251		
Herring, sea	9, 069, 902	49, 136	7, 315, 260	65, 159		
Mackerel	168, 643	8, 781	1, 116, 428	49, 533		
Pollock	175, 945	2, 542	91, 170	1, 360		
Salmon			1, 250	333	17, 952	5, 088
Shad	19, 400	291	7, 900	459		
Smelts	140, 537	21, 304	48, 533	7, 790	29, 099	4, 365
Suckers			5, 045	404		
Swordfish	666	80				
Tuna or "horse mackerel"			19, 680	1, 181		
Whiting	12, 000	60				
Wolffish	2, 283	23	550	7		
Yellow perch			138	17		
Crabs, hard	10, 000	500	323, 000	10, 140		
Lobsters	1, 998, 295	532, 974	917, 498	235, 964		
Squid			22, 100	221		
Clams:						
Soft, public	743, 002	26, 077	903, 652	30, 011		
Soft, private			257, 040	6, 804		
Scallops, sea	270, 702	52, 219				
Total	20, 669, 767	870, 514	14, 669, 426	478, 179	47, 251	9, 470

Fisheries of Maine, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Sagadahoc		Waldo		Washington		York	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	82,000	$656	6,665	$200	211,598	$1,566	--------	--------
Butterfish	75,000	11,225	--------	--------	--------	--------	--------	--------
Cod	548,080	16,079	51,000	1,230	1,188,792	28,613	637,622	$19,360
Cusk	12,790	255	--------	--------	34,507	345	63,414	1,307
Eels	46,305	2,631	39,900	3,191	24,725	3,677	48,150	4,815
Flounders	--------	--------	--------	--------	--------	--------	2,341	70
Haddock	190,870	5,721	23,665	710	798,912	18,808	826,417	26,486
Hake	117,500	1,175	32,750	655	466,423	3,512	206,439	2,870
Halibut	2,400	360	--------	--------	26,313	4,731	4,618	705
Herring, sea	1,725,000	10,870	136,500	615	32,396,695	134,559	60,000	600
Mackerel	272,400	8,940	6,000	300	--------	--------	358,200	13,778
Pollock	32,400	324	--------	--------	111,406	1,926	68,223	936
Salmon	1,950	488	22,750	7,114	7,330	2,696	--------	--------
Shad	--------	--------	--------	--------	731	73	--------	--------
Smelts	68,650	13,258	82,133	12,605	82,181	17,382	6,665	1,000
Sturgeon	250	50	--------	--------	--------	--------	--------	--------
Suckers	10,500	840	--------	--------	--------	--------	--------	--------
Tomcod	--------	--------	40,000	600	--------	--------	--------	--------
Tuna or "horse mackerel"	56,927	2,748	--------	--------	--------	--------	4,800	288
Wolffish	--------	--------	--------	--------	--------	--------	14,927	167
Yellow perch	250	28	--------	--------	--------	--------	--------	--------
Crabs, hard	--------	--------	--------	--------	22,500	169	--------	--------
Lobsters	182,422	47,875	8,957	2,801	1,372,652	328,936	303,967	86,255
Squid	63,000	624	--------	--------	--------	--------	--------	--------
Clams:								
Cockle	--------	--------	--------	--------	4,206	210	--------	--------
Soft, public	405,960	16,003	35,020	2,840	2,874,462	79,533	520,200	30,600
Scallops, sea	--------	--------	--------	--------	25,116	2,890	--------	--------
Total	3,894,654	140,150	485,340	32,862	39,648,549	629,626	3,125,983	189,237

Industries related to the fisheries of Maine, 1930

TRANSPORTING

Item	Cumberland County	Hancock County	Knox County	Washington County	Total
Persons engaged:	*Number*	*Number*	*Number*	*Number*	*Number*
On transporting vessels	22	23	18	176	239
On transporting boats	--------	--------	--------	1	1
Total	22	23	18	177	240
Vessels:					
Motor—					
5 to 10 tons	9	7	6	43	65
11 to 20 tons	2	4	3	33	42
21 to 30 tons	--------	--------	--------	6	6
31 to 40 tons	--------	--------	--------	1	1
41 to 50 tons	--------	--------	--------	1	1
Total	11	11	9	84	115
Net tonnage	96	111	79	974	1,260
Boats	--------	--------	--------	1	1

Industries related to the fisheries of Maine, 1930—Continued

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Cumberland County	Hancock County	Knox County	Lincoln County	Penobscot, Sagadahoc, and York Counties	Washington County	Total
Establishments	29	29	33	13	4	79	187
Persons engaged:							
Proprietors	43	32	29	12	5	93	214
Salaried employees	59	9	24	7	1	54	154
Wage earners—							
Average for season	1,428	614	474	209	21	3,143	5,809
Average for year	440	199	170	98	21	886	1,814
Paid to salaried employees	$153,317	$31,126	$74,971	$8,877	$7,800	$128,032	$404,123
Paid to wage earners	399,505	177,969	145,919	78,788	34,005	581,900	1,418,086
Total salaries and wages	552,822	209,095	220,890	87,665	41,805	709,932	1,822,209

PRODUCTS MANUFACTURED [1]

Item	Quantity	Value
Alewives, salted.....pounds	582,400	$15,119
Cod:		
Fresh sticks.....do	280,390	49,486
Salted.....do	1,477,124	85,504
Fish cakes, canned.....standard cases	9,051	59,520
Oil, cod-liver.....gallons	33,904	21,662
Cusk:		
Fresh sticks.....pounds	150,490	25,732
Salted.....do	85,269	3,839
Flounders, fresh fillets.....do	8,960	1,402
Haddock:		
Fresh sticks.....do	183,470	31,564
Fresh fillets.....do	504,988	84,609
Frozen fillets.....do	566,349	66,702
Salted.....do	121,367	6,253
Finnan haddie.....do	178,800	25,370
Smoked fillets.....do	193,150	38,530
Hake:		
Fresh sticks.....do	214,000	35,092
Fresh fillets.....do	39,605	4,437
Salted.....do	3,195,722	86,051
Herring, sea:		
Smoked—		
Bloaters.....do	1,639,445	76,434
Boneless.....do	1,387,750	149,283
Lengthwise.....do	127,794	12,780
Medium-scaled.....do	265,088	26,263
Miscellaneous.....do	54,447	8,209
Canned, "sardines".....standard cases	1,399,212	4,459,071
Meal.....tons	2,126	77,913
Scrap, dry pomace.....do	3,736	7,592
Oil.....gallons	125,242	32,346
Scales.....pounds	81,153	1,932
Pollock, salted.....do	173,067	8,381
Soft clams:		
Canned—		
Whole.....standard cases	95,203	419,636
Chowder.....do	56,926	177,991
Juice and bouillon.....do	16,388	54,782
Unclassified products:		
Fresh and frozen [2].....pounds	173,113	22,953
Salted [3].....do	290,391	46,014
Smoked [4].....do	75,397	10,273
Canned [5].....standard cases	44,955	451,259
Meal, ground fish.....tons	896	45,082
By-products [6]	(7)	148,750
Total		6,877,816

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[1] Includes a small quantity of fish smoked in Rockingham County, N. H.

[2] Includes fresh cod and cusk fillets; frozen cod, cusk, flounders, hake, and wolffish fillets; and frozen hake sticks.

[3] Includes salt cod bits, boneless cod, cheeks, tongues and sounds, herring, mackerel fillets, and mackerel split; and pickled herring.

[4] Includes smoked cod fillets, cusk fillets, and hake fillets.

[5] Includes canned clam cakes, finnan haddie, fish flakes, haddock fillets and smoked herring.

[6] Includes glue, herring skins, herring dry scrap, clam meal, tanners' oil, and buttons made from imported shells.

[7] Data not available.

Industries related to the fisheries of Maine, 1930—Continued

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 223]

Item		Quantity	Value
Alewives:			
Salted	pounds	322,025	$8,057
Smoked	do	208,063	6,937
Cod, salted	do	10,407	765
Cusk, salted	do	2,308	92
Hake, salted	do	685	27
Herring, sea, salted	do	9,170	447
Mackerel, salted	do	665	13
Pollock, salted	do	2,665	118
Crab meat, packaged (fresh-cooked)	do	15,600	7,800
Scallops, sea, fresh-shucked	gallons	57,476	109,700
Total			133,956

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 174 have also been included as fishermen. This fact should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

NEW HAMPSHIRE

Fisheries of New Hampshire, 1930 [1]

OPERATING UNITS: BY GEAR

Item	Purse seines, mackerel	Haul seines	Lines		Pots, lobster	Harpoons, swordfish	Total, exclusive of duplication
			Hand	Trawl			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On boats and shore—							
Regular	6	3		12	34	4	46
Casual			40				40
Total	6	3	40	12	34	4	86
Boats:							
Motor	2	1		6	32	2	38
Other	2	1			2		5
Apparatus:							
Number	2	1	160	3,600	2,570	2	
Length, yards	500	100					
Hooks			160	180,000			

CATCH: BY GEAR

Species	Purse seines		Haul seines		Lines, Hand		Lines, Trawl		Pots, lobster		Harpoons, swordfish	
	Lbs.	*Value*	*Lbs.*	*Value*	*Lbs.*	*Value*	*Lbs.*	*Value*	*Lbs.*	*Value*	*Lbs.*	*Value*
Cod							157,800	$3,945				
Cusk							7,890	117				
Flounders							15,780	473				
Haddock							394,000	15,780				
Hake							78,900	1,174				
Halibut							300	45				
Herring, sea			60,000	$450								
Mackerel	100,000	$4,000										
Pollock							39,450	562				
Smelt					8,000	$1,600						
Tuna or "horse mackerel"											2,700	$162
Wolffish							23,670	473				
Lobsters									180,587	$40,363		
Total	100,000	4,000	60,000	450	8,000	1,600	717,790	22,569	180,587	40,363	2,700	162

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[1] The fisheries of New Hampshire are confined to Rockingham County.

Industries related to the fisheries of New Hampshire, 1930

TRANSPORTING

Persons engaged on vessels	3
Vessels:	
Number	1
Net tonnage	16

WHOLESALE AND MANUFACTURING IN ROCKINGHAM COUNTY

OPERATING UNITS, SALARIES, AND WAGES

Establishments	3
Persons engaged:	
Proprietors	5
Wage earners [1]	9
Paid to salaried employees and wage earners	$17, 780

NOTE.—A small amount of smoked fish produced in New Hampshire has been included with Maine to avoid the disclosure of private enterprise.

MASSACHUSETTS

Fisheries of Massachusetts, 1930

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets		Lines		Pound nets	Floating traps	Weirs
	Mackerel	Other		Anchor	Drift	Hand	Trawl			
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	1, 019	------	------	209	681	254	1, 243	------	------	------
On boats and shore—										
Regular	74	2	34	70	187	173	535	196	34	8
Casual	------	6	8	2	3	10	1	------	------	------
Total	1, 093	8	42	281	871	437	1, 779	196	34	8
Vessels:										
Motor—										
5 to 10 tons	5	------	------	4	7	1	5	------	------	------
11 to 20 tons	33	------	------	8	40	6	18	------	------	------
21 to 30 tons	16	------	------	9	12	1	1	------	------	------
31 to 40 tons	11	------	------	------	7	1	2	------	------	------
41 to 50 tons	9	------	------	1	6	------	6	------	------	------
51 to 60 tons	9	------	------	------	3	3	10	------	------	------
61 to 70 tons	5	------	------	------	1	4	14	------	------	------
71 to 80 tons	------	------	------	------		1	7	------	------	------
81 to 90 tons	2	------	------	------	------	1	3	------	------	------
91 to 100 tons	1	------	------	------	------		3	------	------	------
111 to 120 tons	------	------	------	------	------	------	2	------	------	------
121 to 130 tons	------	------	------	------	------	------	1	------	------	------
131 to 140 tons	------	------	------	------	------	------	1	------	------	------
Total	91	------	------	22	76	18	73	------	------	------
Net tonnage	2, 823	------	------	433	1, 699	729	3, 685	------	------	------
Sail—5 to 10 tons	------	------	------	------	------	1	------	------	------	------
Net tonnage	------	------	------	------	------	6	------	------	------	------
Total vessels	91	------	------	22	76	19	73	------	------	------
Total net tonnage	2, 823	------	------	433	1, 699	735	3, 685	------	------	------
Boats:										
Motor	14	3	8	49	67	118	202	59	13	2
Other	15	5	18	41	44	33	24	103	19	4
Accessory boats	109	------	------	------	50	9	643	------	------	------
Apparatus:										
Number	105	3	13	2, 034	9, 461	583	54, 956	136	19	6
Length, yards	50, 098	410	2, 225	------	------	------	------	------	------	------
Square yards	------	------	------	653, 340	3, 286, 236	------	------	------	------	------
Hooks, baits, or snoods	------	------	------	------	------	849	2, 730, 464	------	------	------

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[1] Salaried employees are included with wage earners.

Fisheries of Massachusetts, 1930—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Fyke nets	Dip nets	Push nets	Otter trawls	Box traps	Pots				Harpoons, swordfish
						Crab	Eel	Lobster	Periwinkle or cockle	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels				2,410				5		979
On boats and shore—										
Regular	19	110	18	190	5	22	52	635	11	49
Casual	8	13	35				7	287		
Total	27	123	53	2,600	5	22	59	927	11	1,028
Vessels:										
Steam—										
91 to 100 tons				5						
111 to 120 tons				6						
121 to 130 tons				1						
131 to 140 tons				1						
151 to 160 tons				1						
171 to 180 tons				2						
181 to 190 tons				1						
201 to 210 tons				1						
211 to 220 tons				2						
241 to 250 tons				1						
261 to 270 tons				1						
Total				22						
Net tonnage				3,291						
Motor—										
5 to 10 tons				25				3		10
11 to 20 tons				79						31
21 to 30 tons				23						8
31 to 40 tons				14						7
41 to 50 tons				15						5
51 to 60 tons				25						15
61 to 70 tons				10						6
71 to 80 tons				9						6
81 to 90 tons				3						1
91 to 100 tons				7						
101 to 110 tons				5						
111 to 120 tons				13						
131 to 140 tons										1
151 to 160 tons				1						
161 to 170 tons				1						
171 to 180 tons				2						
201 to 210 tons				1						
Total				233				3		90
Net tonnage				9,649				21		3,139
Total vessels				255				3		90
Total net tonnage				12,940				21		3,139
Boats:										
Motor	3	27		76		22	37	643	7	17
Other	19	11	28		1		26	431	4	29
Accessory boats								12		203
Apparatus:										
Number	52	61	53	331	1	1,735	1,782	69,249	1,012	107
Yards at mouth				9,750						

Fisheries of Massachusetts, 1930—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Spears	Dredges			Tongs	Rakes	Forks	Hoes	By hand	Total, exclusive of duplication
		Clam	Oyster	Scallop						
	Numbre	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels		26	11	68		8				4, 445
On boats and shore—										
Regular	114	123	18	371	137	436	343	322	10	2, 859
Casual	97		6	464	45	114	195	258	21	1, 377
Total	211	149	35	903	182	558	538	580	31	8, 681
Vessels:										
Steam—										
91 to 100 tons										5
111 to 120 tons										6
121 to 130 tons										1
131 to 140 tons										1
151 to 160 tons										1
171 to 180 tons										2
181 to 190 tons										1
201 to 210 tons										1
211 to 220 tons										2
241 to 250 tons										1
261 to 270 tons										1
Total										22
Net tonnage										3, 291
Motor—										
5 to 10 tons		5	3	8		1				50
11 to 20 tons		5	1	7		2				130
21 to 30 tons										38
31 to 40 tons				1						24
41 to 50 tons										25
51 to 60 tons										41
61 to 70 tons										27
71 to 80 tons										17
81 to 90 tons										6
91 to 100 tons										10
101 to 110 tons										5
111 to 120 tons										15
121 to 130 tons										1
131 to 140 tons										1
151 to 160 tons										1
161 to 170 tons										1
171 to 180 tons										2
201 to 210 tons										1
Total		10	4	16		3				395
Net tonnage		92	40	200		30				15, 384
Sail—5 to 10 tons										1
Net tonnage										6
Total vessels		10	4	16		3				418
Total net tonnage		92	40	200		30				18, 681
Boats:										
Motor		67	10	556	65	72	16	28		1, 669
Other	68				112	469	97	248		1, 477
Accessory boats										979
Apparatus:										
Number	201	78	26	2, 877	183	552	538	610		
Yards at mouth		40	27	2, 337						

Fisheries of Massachusetts, 1930—Continued

CATCH: BY GEAR

Species	Purse seines				Haul seines		Gill nets			
	Mackerel		Other				Anchor		Drift	
	Pounds	*Value*	*Lbs.*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	194, 600	$2, 349			879, 000	$8, 790				
Bluefish					900	108	4, 215	$889	28, 000	$2, 800
Butterfish	17, 130	1, 203					2, 450	180	500	45
Catfish and bullheads							13, 200	480		
Cod							4, 198, 601	181, 595		
Cusk							7, 581	136		
Flounders							2, 595	101		
Haddock							1, 488, 224	49, 443		
Hake							1, 189, 261	18, 982		
Herring, sea	331, 660	4, 058			2, 500	38			6, 000	120
Launce			80, 750	$1, 340	80, 000	1, 600				
Mackerel	38, 390, 393	1, 289, 713			23, 500	1, 175	253, 555	12, 639	5, 106, 885	200, 604
Pollock							8, 577, 040	132, 399		
Sea bass									1, 000	150
Shad	19, 001	367			8, 000	560	4, 588	295	100	8
Sharks	1, 921	104					9, 771	352		
Skates							388	25		
Striped bass					16, 000	3, 875				
White perch					450	45				
Wolffish							112	2		
Total	38, 954, 705	1, 297, 794	80, 750	1, 340	1, 010, 350	16, 191	15, 751, 581	397, 518	5, 142, 485	203, 727

Species	Lines				Pounds net		Floating traps	
	Hand		Trawl					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					131, 151	$1, 288	4, 000	$55
Bluefish	129, 175	$10, 940			32, 417	3, 805	2, 935	358
Bonito					80, 617	6, 357		
Butterfish			540	$27	551, 879	45, 053	56, 099	4, 954
Carp					2, 976	59		
Catfish and bullheads			24, 140	598			385	14
Cod	3, 361, 921	97, 077	29, 646, 776	902, 932	42, 241	1, 384	43, 345	1, 288
Cusk	223, 033	5, 787	3, 755, 171	83, 591				
Eels	3, 100	310	81, 488	1, 640	2, 147	172		
Flounders	52, 380	2, 088	2, 474, 152	110, 500	39, 793	2, 141		
Grayfish					56, 196	2, 370		
Haddock	1, 513, 361	51, 554	43, 182, 335	1, 414, 691			900	27
Hake	228, 824	6, 712	7, 677, 567	149, 214				
Halibut	60, 953	10, 222	2, 140, 082	322, 505				
Herring, sea					2, 548, 092	29, 189	847, 672	12, 432
King whiting or "Kingfish"					200	21		
Launce							9, 676	194
Mackerel	23, 500	1, 445	495	59	1, 198, 023	42, 835	353, 908	13, 502
Pollock	177, 943	3, 023	1, 483, 940	26, 812	6, 073	117	119, 010	1, 788
Rosefish			294	4				
Salmon							30	9
Scup or porgy	469, 370	23, 623			176, 897	6, 603		
Sea bass	73, 718	6, 146			2, 760	437		
Sea robin					100	1		
Shad					21, 967	1, 688		
Sharks					27, 815	194		
Skates			16, 500	330	1, 541	42		
Smelt	6, 200	2, 717						
Squeteagues or "sea trout":								
Gray					1, 238	149		
Spotted					1, 246	221		
Striped bass	4, 500	1, 150			4, 785	612		
Sturgeon					695	191		
Swordfish	266	62	21, 116	4, 094				
Tautog	77, 850	4, 895			31, 258	1, 843		
Tuna or "horse mackerel"			85	8	58, 226	4, 520	5, 520	386
Whiting					5, 349, 460	46, 793	1, 809, 440	15, 402
Wolffish	30, 431	646	346, 574	8, 944				
Squid					3, 128, 549	51, 404	367, 011	7, 460
Total	6, 436, 525	228, 397	90, 851, 255	3, 025, 949	13, 498, 342	249, 489	3, 619, 931	57, 869

Fisheries of Massachusetts, 1930—Continued

CATCH: BY GEAR—Continued

Species	Weirs		Fyke nets		Dip nets		Push nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	3, 245	$4			474, 400	$4, 269		
Bluefish	12, 000	1, 800						
Bonito	1, 800	162						
Butterfish	11, 525	1, 630						
Cod	10, 711	89						
Eels			79, 460	$9, 979				
Grayfish	27, 500	500						
Herring, sea	53, 625	1, 030			4, 897, 500	66, 600		
Mackerel	53, 449	2, 865			100, 000	1, 800		
Minnows					6, 000	1, 200		
Striped bass	2, 100	462						
Tautog	602	20						
Tuna or " horse mackerel "	1, 200	120						
Whiting	517, 703	12, 559						
Shrimp					4, 800	3, 600		
Squid	334, 446	10, 058						
Scallops: Bay							70, 200	$20, 550
Total	1, 029, 906	31, 299	79, 460	9, 979	5, 482, 700	77, 469	70, 200	20, 550

Species	Otter trawls		Box traps		Pots			
					Crab		Eel	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	800	$28	100, 000	$750				
Bluefish	665	52						
Butterfish	214, 990	19, 075						
Catfish and bullheads	64, 400	1, 290						
Cod	40, 218, 629	1, 173, 983						
Croaker	140, 005	5, 600						
Cunner	18, 735	574						
Cusk	727, 291	14, 035						
Eels	9, 670	345					237, 850	$24, 254
Flounders	28, 759, 989	1, 147, 628						
Frigate mackerel	384, 661	17, 921						
Goosefish	200	3						
Grayfish	600	12						
Haddock	156, 502, 969	4, 925, 534						
Hake	10, 144, 917	237, 150						
Halibut	679, 409	112, 911						
Launce							12, 500	1, 250
Mackerel	27, 568	3, 021						
Pollock	4, 650, 670	97, 333						
Rosefish	109, 563	2, 185						
Salmon	25	1						
Scup or porgy	145, 741	5, 572						
Sea bass	64, 109	2, 644						
Shad	493	23						
Sharks	8, 783	287						
Skates	33, 374	419						
Smelt	50	2						
Sturgeon	7, 050	824						
Swordfish	18, 515	3, 008						
Tuna or "horse mackerel"	1, 035	189						
Whiting	225, 685	6, 965						
Wolffish	2, 143, 874	42, 378						
Crabs, hard					396, 400	$74, 350		
Total	245, 304, 465	7, 820, 992	100, 000	750	396, 400	74, 350	250, 350	25, 504

Fisheries of Massachusetts, 1930—Continued

CATCH: BY GEAR—Continued

Species	Pots				Harpoons, swordfish		Spears	
	Lobster		Periwinkle or cockle					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					2, 650	$97		
Eels							65, 350	$7, 766
Flounders							6, 000	180
Sharks					779	39		
Swordfish					3, 688, 436	650, 429		
Crabs, hard	61, 898	$11, 930						
Lobsters	2, 338, 234	625, 946						
Clams, cockle			9, 450	$1, 975				
Periwinkles			14, 742	3, 587				
Total	2, 400, 132	637, 876	24, 192	5, 562	3, 691, 865	650, 565	71, 350	7, 946

Species	Dredges						Tongs	
	Clam		Oyster		Scallop			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:								
Cockle					11, 700	$1, 950		
Hard, public	906, 712	$182, 847					149, 560	$43, 250
Hard, private	14, 400	3, 000					3, 600	2, 049
Surf or skimmer					1, 600	350		
Mussels					10, 800	2, 100		
Oysters:								
Market, public, spring							700	200
Market, private, spring			103, 188	$45, 262	9, 625	3, 750	108, 762	51, 399
Market, private, fall			82, 105	33, 519	5, 390	1, 750	116, 374	51, 770
Seed, private, spring			63, 000	4, 500	38, 808	1, 386	14, 000	1, 000
Seed, public, fall							31, 500	2, 250
Periwinkles					2, 700	300		
Scallops:								
Bay					1, 351, 444	372, 265		
Sea					510, 738	77, 122		
Total	921, 112	185, 847	245, 893	83, 281	1, 942, 805	460, 973	424, 566	151, 918

Species	Rakes		Forks		Hoes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:								
Cockle							3, 420	$790
Hard, public	833, 432	$250, 913						
Hard, private	48, 000	2, 100						
Razor					380, 266	$20, 476		
Soft public			1, 794, 992	$145, 327	1, 478, 660	130, 607		
Surf or skimmer					31, 875	2, 200	4, 800	1, 200
Oysters, market, private, fall	7, 700	3, 000						
Scallops, bay							13, 500	3, 750
Irish moss	93, 000	5, 580						
Total	982, 132	261, 593	1, 794, 992	145, 327	1, 890, 801	153, 283	21, 720	5, 740

Fisheries of Massachusetts, 1930—Continued

OPERATING UNITS: BY COUNTIES

Item	Barnstable	Bristol	Dukes	Essex	Nantucket	Norfolk	Plymouth	Suffolk
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	132	185	37	1,977	76	--------	5	2,033
On boats and shore—								
Regular	898	274	170	633	57	67	256	504
Casual	321	94	75	337	61	58	331	100
Total	1,351	553	282	2,947	194	125	592	2,637
Vessels:								
Steam—								
91 to 100 tons	--------	--------	--------	--------	--------	--------	--------	5
111 to 120 tons	--------	--------	--------	--------	--------	--------	--------	6
121 to 130 tons	--------	--------	--------	--------	--------	--------	--------	1
131 to 140 tons	--------	--------	--------	--------	--------	--------	--------	1
151 to 160 tons	--------	--------	--------	--------	--------	--------	--------	1
171 to 180 tons	--------	--------	--------	--------	--------	--------	--------	2
181 to 190 tons	--------	--------	--------	1	--------	--------	--------	--------
201 to 210 tons	--------	--------	--------	--------	--------	--------	--------	1
211 to 220 tons	--------	--------	--------	--------	--------	--------	--------	2
241 to 250 tons	--------	--------	--------	--------	--------	--------	--------	1
261 to 270 tons	--------	--------	--------	--------	--------	--------	--------	1
Total	--------	--------	--------	1	--------	--------	--------	21
Net tonnage	--------	--------	--------	184	--------	--------	--------	3,107
Motor—								
5 to 10 tons	13	5	3	8	8	--------	3	10
11 to 20 tons	11	5	3	40	12	--------	--------	59
21 to 30 tons	--------	5	1	18	1	--------	--------	13
31 to 40 tons	--------	5	--------	12	--------	--------	--------	7
41 to 50 tons	--------	4	--------	14	--------	--------	--------	7
51 to 60 tons	--------	1	--------	25	--------	--------	--------	15
61 to 70 tons	1	--------	--------	15	--------	--------	--------	11
71 to 80 tons	--------	--------	--------	13	--------	--------	--------	4
81 to 90 tons	--------	--------	--------	3	--------	--------	--------	3
91 to 100 tons	--------	--------	--------	6	--------	--------	--------	4
101 to 110 tons	--------	--------	--------	1	--------	--------	--------	4
111 to 120 tons	--------	--------	--------	3	--------	--------	--------	12
121 to 130 tons	--------	--------	--------	--------	--------	--------	--------	1
131 to 140 tons	--------	--------	--------	--------	--------	--------	--------	1
151 to 160 tons	--------	--------	--------	--------	--------	--------	--------	1
161 to 170 tons	--------	--------	--------	--------	--------	--------	--------	1
171 to 180 tons	--------	--------	--------	--------	--------	--------	--------	2
201 to 210 tons	--------	--------	--------	--------	--------	--------	--------	1
Total	25	25	7	158	21	--------	3	156
Net tonnage	327	662	97	6,815	233	--------	25	7,225
Sail, 5 to 10 tons	1	--------	--------	--------	--------	--------	--------	--------
Net tonnage	6	--------	--------	--------	--------	--------	--------	--------
Total vessels	26	25	7	159	21	--------	3	177
Total net tonnage	333	662	97	6,999	233	--------	25	10,332
Boats:								
Motor	497	202	160	283	74	43	249	161
Other	498	153	142	346	47	23	253	15
Accessory boats	35	7	18	590	9	--------	--------	320
Apparatus:								
Purse seines—								
Mackerel	4	3	1	59	--------	--------	--------	38
Length, yards	1,850	378	500	28,890	--------	--------	--------	18,480
Other	3	--------	--------	--------	--------	--------	--------	--------
Length, yards	410	--------	--------	--------	--------	--------	--------	--------
Haul seines	5	1	1	5	--------	--------	1	--------
Length, yards	1,300	100	450	350	--------	--------	25	--------
Gill nets—								
Anchor	686	--------	--------	1,281	--------	7	6	54
Square yards	159,820	--------	--------	476,360	--------	1,680	1,440	14,040
Drift	1,022	210	143	5,524	--------	--------	47	2,515
Square yards	356,760	75,600	44,616	1,924,020	--------	--------	20,240	865,000
Lines—								
Hand	56	148	19	278	2	10	14	56
Hooks	65	296	19	377	2	20	14	56
Trawl	4,736	--------	240	23,036	--------	--------	180	26,764
Hooks	236,800	--------	7,800	1,143,336	--------	--------	6,480	1,336,048

Fisheries of Massachusetts, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Barnstable	Bristol	Dukes	Essex	Nantucket	Norfolk	Plymouth	Suffolk
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Apparatus—Continued.								
Pound nets	97	15	14	1	4		5	
Floating traps	7			12				
Weirs	6							
Fyke nets	42	7	3					
Dip nets	17			8		7	14	15
Push nets	45				8			
Otter trawls	56	25	15	69	21			145
Yards at mouth	1, 575	850	395	2, 080	570			4, 280
Box traps							1	
Pots—								
Crab						50	35	1, 650
Eel	637	145	275	45	620		60	
Lobster	8, 752	11, 980	8, 779	19, 129	1, 221	3, 426	12, 137	3, 825
Periwinkle and cockle	850			75			87	
Harpoons, swordfish	20	8	5	53	3			18
Spears	66	51	1	15			68	
Dredges—								
Clam	41	17	3		17			
Yards at mouth	20	9	1		10			
Oyster	20	4					2	
Yards at mouth	21	3					3	
Scallop	729	465	542		406		734	1
Yards at mouth	574	419	452		277		613	2
Tongs	64	70					49	
Rakes	295	46	87		48		76	
Forks	41	9	1	275		75	12	125
Hoes	140			338			117	15

CATCH: BY COUNTIES

Species	Barnstable		Bristol		Dukes		Essex	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	361, 808	$3, 206	6, 848	$116	785, 940	$7, 692	197, 250	$2, 461
Bluefish	112, 728	11, 698	7, 235	440	19, 309	2, 387	67, 935	5, 558
Bonito	60, 581	4, 792	500	40	7, 236	559		
Butterfish	448, 980	36, 329	22, 536	1, 876	82, 118	6, 940	156, 589	13, 490
Carp	2, 976	59						
Catfish and bullheads	29, 700	596	2, 700	54			37, 725	1, 092
Cod	4, 193, 539	152, 026	3, 020, 401	77, 974	265, 205	7, 447	25, 761, 505	803, 393
Croaker			140, 005	5, 600				
Cunner			415	23				
Cusk	95, 644	1, 811	1, 634	28			2, 119, 156	47, 230
Eels	144, 650	16, 588	30, 207	3. 321	72, 500	7, 536	88, 268	2, 316
Flounders	4, 506, 096	141, 856	4, 873, 326	239, 798	1, 117, 831	35, 910	2, 341, 666	105, 582
Frigate mackerel							20, 150	888
Goosefish							200	3
Grayfish	38, 096	811	1, 200	15	40, 000	2, 000		
Haddock	4, 101, 828	123, 162	12, 422, 658	381, 483	204, 726	7, 023	53, 942, 434	1, 748, 115
Hake	895, 775	17, 481	202, 802	2, 573	17, 040	328	5, 564, 841	101, 279
Halibut	6, 765	1, 033	46, 597	7, 225			1, 892, 731	286, 736
Herring, sea	2, 737, 152	32, 365	25, 487	297			1, 050, 140	14, 551
King whiting or "kingfish"	100	13						
Launce	90, 426	1, 534					92, 500	2, 850
Mackerel	3, 079, 155	109, 566	723, 090	16, 605	385, 929	15, 159	27, 390, 087	942, 841
Minnows	6, 000	1, 200						
Pollock	155, 854	2, 805	53, 293	1, 050	6, 860	131	9, 868, 067	156, 413
Rosefish			435	9			21, 269	414
Salmon							30	9
Scup or porgy	56, 503	2, 912	476, 360	23, 305	134, 795	4, 346		
Sea bass	2, 750	300	96, 215	6, 851	1, 622	176		
Sea robin	100	1						
Shad	21, 778	1, 674	89	6			30, 399	1, 167
Sharks	440	5	25, 575	135			14, 298	587
Skates			2, 723	54			463	27
Smelt							4, 100	2, 465
Squeteagues or "sea trout":								
Gray			1, 238	149				
Spotted	200	40			546	81		
Striped bass	27, 385	6, 099						
Sturgeon	350	96	740	142			700	67

Fisheries of Massachusetts, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Barnstable		Bristol		Dukes		Essex	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Swordfish	341, 099	$60, 182	155, 997	$21, 190	297, 144	$51, 893	2, 293, 767	$416, 025
Tautog	16, 203	950	59, 337	3, 500	21, 570	1, 300	--------	--------
Tuna or "horse mackerel"	64, 296	4, 961	--------	--------	650	65	1, 120	197
White perch	--------	--------	450	45	--------	--------	--------	--------
Whiting	6, 095, 473	60, 203	11, 152	198	6, 728	135	1, 201, 100	11, 112
Wolffish	48, 667	953	90, 347	1, 283	--------	--------	391, 792	7, 564
Crabs, hard	--------	--------	--------	--------	--------	--------	37, 708	8, 117
Lobsters	326, 062	83, 308	259, 404	68, 350	356, 641	79, 202	607, 880	189, 771
Shrimp	4, 800	3, 600	--------	--------	--------	--------	--------	--------
Squid	3, 416, 401	61, 754	150, 689	2, 062	92, 921	1, 586	113, 195	2, 384
Clams:								
Cockle	7, 020	1, 690	--------	--------	--------	--------	--------	--------
Hard, public	1, 069, 280	253, 940	316, 120	93, 550	160, 880	53, 798	--------	--------
Hard, private	51, 600	4, 149	--------	--------	--------	--------	--------	--------
Razor	251, 546	14, 201	--------	--------	--------	--------	--------	--------
Soft public	121, 760	25, 653	3, 600	900	1, 000	225	1, 955, 692	158, 171
Surf or skimmer	--------	--------	4, 800	1, 200	1, 600	350	31, 875	2, 200
Oysters:								
Market, private, spring	200, 808	92, 086	--------	--------	--------	--------	--------	--------
Market, private, fall	197, 794	85, 122	6, 160	1, 950	--------	--------	--------	--------
Seed, private, spring	--------	--------	77, 000	5, 500	--------	--------	--------	--------
Seed, public, fall	31, 500	2, 250	--------	--------	--------	--------	--------	--------
Periwinkles	9, 324	2, 383	--------	--------	2, 700	300	2, 160	480
Scallops:								
Bay	600, 274	167, 335	149, 670	43, 637	386, 586	107, 385	--------	--------
Sea	47, 940	8, 734	462, 420	68, 320	--------	--------	--------	--------
Total	34, 079, 206	1, 603, 512	23, 931, 455	1, 080, 854	4, 470, 077	393, 954	137, 298, 792	5, 035, 555

Species	Nantucket		Norfolk		Plymouth		Suffolk	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	--------	--------	22, 500	$225	397, 500	$3, 750	18, 000	$180
Bluefish	2, 500	$625	--------	--------	--------	--------	600	44
Bonito	14, 100	1, 128	--------	--------	--------	--------	--------	--------
Butterfish	35, 250	3, 878	--------	--------	--------	--------	109, 640	9, 654
Catfish and bullheads	--------	--------	--------	--------	--------	--------	32, 000	640
Cod	1, 120, 889	30, 786	11, 000	300	100, 518	3, 525	43, 049, 167	1, 282, 897
Cunner	--------	--------	--------	--------	--------	--------	18, 320	551
Cusk	--------	--------	--------	--------	--------	--------	2, 496, 642	54, 480
Eels	111, 000	11, 100	--------	--------	22, 850	3, 266	9, 590	339
Flounders	3, 480, 355	164, 051	2, 600	156	7, 000	420	15, 006, 035	574, 865
Frigate mackerel	--------	--------	--------	--------	--------	--------	364, 511	17, 033
Grayfish	4, 400	44	--------	--------	--------	--------	600	12
Haddock	1, 421, 989	29, 567	--------	--------	28, 600	780	130, 565, 554	4, 151, 119
Hake	418	8	--------	--------	--------	--------	12, 559, 693	290, 389
Halibut	3, 168	482	--------	--------	--------	--------	931, 183	150, 162
Herring, sea	--------	--------	17, 500	200	836, 500	6, 274	4, 020, 270	59, 780
King whiting or "kingfish"	100	8	--------	--------	--------	--------	--------	--------
Mackerel	37, 600	2, 632	9, 000	360	104, 750	3, 139	13, 801, 665	479, 356
Pollock	5, 610	203	1, 650	60	--------	--------	4, 923, 342	100, 810
Rosefish	--------	--------	--------	--------	--------	--------	88, 153	1, 766
Salmon	--------	--------	--------	--------	--------	--------	25	1
Scup or porgy	4, 350	435	--------	--------	--------	--------	120, 000	4, 800
Sea bass	1, 000	250	--------	--------	--------	--------	40, 000	1, 800
Shad	200	16	--------	--------	--------	--------	1, 683	78
Sharks	1, 800	54	--------	--------	--------	--------	6, 956	195
Skates	--------	--------	--------	--------	--------	--------	48, 617	735
Smelt	--------	--------	2, 100	252	--------	--------	50	2
Squeteagues or "sea trout," spotted	500	100	--------	--------			--------	--------
Sturgeon	--------	--------	--------	--------	--------	--------	5, 955	710
Swordfish	115, 568	15, 503	--------	--------	--------	--------	524, 758	92, 800
Tautog	--------	--------	--------	--------	12, 600	1, 008	--------	--------
Whiting	--------	--------	--------	--------	381, 950	3, 374	205, 885	6, 697
Wolffish	--------	--------	--------	--------	--------	--------	1, 990, 185	42, 170
Crabs, hard	--------	--------	12, 290	2, 290	12, 500	1, 660	395, 800	74, 213
Lobsters	45, 368	11, 689	129, 287	39, 423	528, 591	134, 159	85, 001	20, 044
Squid	21, 000	420	--------	--------	35, 800	716	--------	--------

Fisheries of Massachusetts, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Nantucket		Norfolk		Plymouth		Suffolk	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Clams:								
Cockle					17,550	3,025		
Hard, public	285,424	59,360			58,000	16,362		
Hard, private	14,400	3,000						
Razor					128,720	6,275		
Soft, public			54,000	5,085	143,600	15,150	994,000	70,750
Mussels							10,800	2,100
Oysters:								
Market, public, spring					770	200		
Market, private, spring					21,367	8,325		
Market, private, fall					7,615	2,967		
Seed, private, spring					38,808	1,386		
Periwinkles					3,258	724		
Scallops:								
Bay	106,194	29,898			192,420	48,310		
Sea	378	68						
Irish moss					93,000	5,580		
Total	6,833,561	365,305	261,927	48,351	3,174,267	270,375	232,424,680	7,491,172

Industries related to the fisheries of Massachusetts, 1930

TRANSPORTING

Item	Barnstable County	Suffolk County	Total
	Number	*Number*	*Number*
Persons engaged on vessels	2	28	30
Vessels, motor—			
5 to 10 tons	2	2	4
11 to 20 tons		5	5
21 to 30 tons		2	2
41 to 50 tons		1	1
Total	2	10	12
Net tonnage	12	187	199

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Barnstable County	Bristol County	Dukes, Middlesex, Nantucket, and Norfolk Counties	Essex County	Plymouth County	Suffolk County	Total
Establishments	27	11	4	44	8	99	193
Persons engaged:							
Proprietors	11	7	2	28	7	22	77
Salaried employees	27	22	4	211	6	492	762
Wage earners—							
Average for season	227	58	32	1,172	24	1,221	2,734
Average for year	166	41	30	1,003	15	1,174	2,429
Paid to salaried employees	$56,478	$28,885	$8,276	$541,072	$9,380	$1,342,606	$1,986,697
Paid to wage earners	196,895	53,137	38,730	1,123,654	21,817	1,771,893	3,206,126
Total salaries and wages	253,373	82,022	47,006	1,664,726	31,197	3,114,499	5,192,823

Industries related to the fisheries of Massachusetts, 1930—Continued

WHOLESALE AND MANUFACTURING—Continued

PRODUCTS MANUFACTURED

Item	Quantity	Value
Cod:		
Fresh fillets .... pounds	3,732,070	$538,878
Frozen fillets .... do	1,291,480	165,447
Salted .... do	6,659,091	552,300
Smoked fillets .... do	567,217	80,085
Oil, cod-liver .... gallons	101,980	81,195
Cusk:		
Fresh fillets .... pounds	282,680	43,067
Salted .... do	398,649	18,448
Smoked fillets .... do	867,145	122,400
Flounders:		
Fresh fillets .... do	1,210,243	233,664
Frozen fillets .... do	309,110	53,073
Haddock:		
Fresh fillets .... do	40,244,170	6,300,610
Frozen fillets .... do	12,655,276	1,974,343
Salted .... do	558,132	32,781
Finnan haddie .... do	4,099,511	346,261
Smoked fillets .... do	720,748	125,407
Canned flakes .... standard cases	20,142	202,864
Hake:		
Fresh fillets .... pounds	2,008,907	259,974
Frozen fillets .... do	335,127	45,134
Salted .... do	1,800,022	87,789
Smoked fillets .... do	14,000	1,900
Halibut, frozen fillets .... do	8,379	2,409
Herring, sea:		
Smoked—		
Bloaters .... do	1,131,417	186,258
Kippered .... do	179,467	40,041
Mackerel:		
Fresh fillets .... do	139,012	27,798
Salted fillets .... do	1,969,626	229,709
Salted .... do	2,277,667	190,299
Pollock:		
Fresh fillets .... do	272,714	35,648
Frozen fillets .... do	3,030	394
Salted .... do	2,957,113	162,591
Wolffish:		
Fresh fillets .... do	19,812	3,719
Frozen fillets .... do	37,410	5,241
Crab meat, packaged (fresh-cooked) .... do	169,383	93,061
Lobster meat, packaged (fresh-cooked) .... do	103,716	129,488
Clams, soft, fresh-shucked .... gallons	10,125	16,325
Oysters, fresh-shucked .... do	2,279	6,305
Unclassified products:		
Fresh and frozen [1] .... pounds	484,671	52,184
Salted [2] .... do	664,802	35,055
Smoked [3] .... do	529,612	210,670
Canned [4] .... standard cases	167,084	1,189,181
Glue .... gallons	497,838	1,175,826
Meal .... tons	11,224	722,997
By-products [5]	(6)	88,601
Total		15,869,420

[1] Includes fresh halibut and whiting fillets; frozen cusk, mackerel, and salmon fillets; and whiting sticks.

[2] Includes salted alewives, herring, Bismarck herring, Scotch-cured herring, split mackerel, mackerel fillets, salmon, shad, and tongues and cheeks.

[3] Includes smoked alewives, butterfish, flounders, lake trout, mackerel, salmon, shad, and whitefish.

[4] Includes the following canned products: Cod cakes, cod balls, etc., mackerel, haddock chowder, creamed fish, finnan haddie, roe, dog food, and clam products.

[5] Includes isinglass, dry scrap, blackfish oil, tanner's oil, and buttons and novelties from imported marine shells.

[6] Data not available.

Industries related to the fisheries of Massachusetts, 1930—Continued

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 3,325]

Item	Quantity	Value
Alewives:		
Salted ... pounds	120,000	$6,200
Smoked ... do	16,500	963
Pickled ... do	303,800	7,974
Cod, salted ... do	1,118,785	54,340
Cusk, salted ... do	22,182	554
Hake, salted ... do	10,440	131
Halibut, salted ... do	5,220	649
Mackerel, salted ... do	68,230	2,856
Pollock, salted ... do	1,060	23
Clams, soft, fresh-shucked ... gallons	129,988	145,988
Scallops:		
Bay, fresh-shucked ... do	159,000	395,000
Sea, fresh-shucked ... do	56,000	77,000
Total	--------	691,678

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 2,606 have been included as fishermen. This fact should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

RHODE ISLAND

Fisheries of Rhode Island, 1930

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets		Lines		Pound nets	Floating traps
	Mackerel	Other		Drift	Run-around	Hand	Trawl		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	24	16	--------	13	--------	69	20	6	130
On boats and shore—									
Regular	--------	--------	67	1	31	142	23	43	77
Casual	--------	--------	--------	1	--------	32	--------	--------	--------
Total	24	16	67	15	31	243	43	49	207
Vessels:									
Steam—									
5 to 10 tons	--------	--------	--------	--------	--------	--------	--------	--------	1
11 to 20 tons	--------	--------	--------	--------	--------	--------	--------	--------	3
41 to 50 tons	--------	1	--------	--------	--------	--------	--------	--------	2
Total	--------	1	--------	--------	--------	--------	--------	--------	6
Net tonnage	--------	45	--------	--------	--------	--------	--------	--------	139
Motor—									
5 to 10 tons	1	--------	--------	3	--------	21	7	2	1
11 to 20 tons	3	--------	--------	1	--------	3	1	--------	3
21 to 30 tons	--------	--------	--------	--------	--------	--------	--------	--------	1
Total	4	--------	--------	4	--------	24	8	2	5
Net tonnage	44	--------	--------	35	--------	187	61	12	68
Total vessels	4	1	--------	4	--------	24	8	2	11
Total net tonnage	44	45	--------	35	--------	187	61	12	207
Boats:									
Motor	--------	--------	2	1	5	99	12	3	12
Other	--------	--------	50	1	14	55	--------	36	46
Accessory boats	6	2	12	2	--------	24	8	4	35
Apparatus:									
Number	4	1	27	161	12	432	1,193	62	62
Length, yards	560	320	3,110	--------	--------	--------	--------	--------	--------
Square yards	--------	--------	--------	59,640	24,100	--------	--------	--------	--------
Hooks, baits, or snoods	--------	--------	--------	--------	--------	587	56,550	--------	--------

Fisheries of Rhode Island, 1930—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Fyke nets	Dip nets	Otter trawls	Box traps	Pots			Harpoons	Spears
					Eel	Lobster	Periwinkle		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	--------	--------	212	--------	--------	41	--------	92	--------
On boats and shore—									
Regular	12	14	31	5	34	308	14	38	35
Casual	1	3	1	--------	6	108	6	--------	2
Total	13	17	244	5	40	457	20	130	37
Vessels:									
Steam—									
5 to 10 tons	--------	--------	1	--------	--------	--------	--------	--------	--------
11 to 20 tons	--------	--------	3	--------	--------	--------	--------	--------	--------
Total	--------	--------	4	--------	--------	--------	--------	--------	--------
Net tonnage	--------	--------	45	--------	--------	--------	--------	--------	--------
Motor—									
5 to 10 tons	--------	--------	34	--------	--------	18	--------	25	--------
11 to 20 tons	--------	--------	9	--------	--------	1	--------	5	--------
21 to 30 tons	--------	--------	1	--------	--------	--------	--------	--------	--------
Total	--------	--------	44	--------	--------	19	--------	30	--------
Net tonnage	--------	--------	380	--------	--------	136	--------	249	--------
Total vessels	--------	--------	48	--------	--------	19	--------	30	--------
Total net tonnage	--------	--------	425	--------	--------	136	--------	249	--------
Boats:									
Motor	7	9	18	2	19	296	8	19	1
Other	6	--------	--------	2	17	42	8	18	11
Accessory boats	--------	--------	--------	--------	--------	18	--------	31	--------
Apparatus:									
Number	40	17	66	4	2,015	39,165	875	49	37
Yards at mouth	--------	--------	1,824	--------	--------	--------	--------	--------	--------

Item	Dredges			Tongs	Rakes	Forks	Hoes	By hand	Total, exclusive of duplication
	Clam	Oyster	Scallop						
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	2	68	--------	--------	--------	--------	--------	--------	356
On boats and shore—									
Regular	10	--------	100	337	118	10	6	2	870
Casual	2	--------	81	187	38	3	4	2	403
Total	14	68	181	524	156	13	10	4	1,629
Vessels:									
Steam—									
5 to 10 tons	--------	--------	--------	--------	--------	--------	--------	--------	1
11 to 20 tons	--------	--------	--------	--------	--------	--------	--------	--------	3
21 to 30 tons	--------	1	--------	--------	--------	--------	--------	--------	1
41 to 50 tons	--------	1	--------	--------	--------	--------	--------	--------	3
51 to 60 tons	--------	1	--------	--------	--------	--------	--------	--------	1
Total	--------	3	--------	--------	--------	--------	--------	--------	9
Net tonnage	--------	126	--------	--------	--------	--------	--------	--------	265
Motor—									
5 to 10 tons	1	2	--------	--------	--------	--------	--------	--------	50
11 to 20 tons	--------	9	--------	--------	--------	--------	--------	--------	21
21 to 30 tons	--------	1	--------	--------	--------	--------	--------	--------	2
51 to 60 tons	--------	1	--------	--------	--------	--------	--------	--------	1
Total	1	13	--------	--------	--------	--------	--------	--------	74
Net tonnage	7	231	--------	--------	--------	--------	--------	--------	747
Total vessels	1	16	--------	--------	--------	--------	--------	--------	83
Total net tonnage	7	357	--------	--------	--------	--------	--------	--------	1,012
Boats:									
Motor	5	--------	106	180	50	--------	2	1	578
Other	--------	--------	2	428	109	13	8	1	673
Accessory boats	--------	--------	--------	34	--------	--------	--------	--------	160
Apparatus:									
Number	6	32	532	523	156	13	10	--------	--------
Yards at mouth	4	49	414	--------	--------	--------	--------	--------	--------

Fisheries of Rhode Island, 1930—Continued

CATCH: BY GEAR

Species	Purse seines				Haul seines		Gill nets			
	Mackerel		Other				Drift		Runaround	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	--------	------	--------	------	--------	------	3,000	$360	31,000	$5,360
Eels	--------	------	--------	------	165,200	$17,740	--------	------	--------	------
Flounders	--------	------	--------	------	20,000	1,000	--------	------	--------	------
Mackerel	182,500	$4,750	86,100	$1,507	--------	------	132,000	2,320	--------	------
Menhaden	--------	------	114,800	861	--------	------	--------	------	--------	------
Smelt	--------	------	--------	------	50,000	7,500	--------	------	--------	------
Squeteague or "sea trout," gray	--------	------	--------	------	10,680	1,200	--------	------	5,000	750
Striped bass	--------	------	--------	------	32,000	5,760	--------	------	--------	------
Suckers	--------	------	--------	------	7,600	152	--------	------	--------	------
Tomcod	--------	------	--------	------	1,600	32	--------	------	--------	------
White perch	--------	------	--------	------	27,600	2,760	--------	------	--------	------
Total	182,500	4,750	200,900	2,368	314,680	36,144	135,000	2,680	36,000	6,110

Species	Lines				Pound nets		Floating traps	
	Hand		Trawl					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore	--------	------	--------	------	--------	------	34,759	$703
Alewives	--------	------	--------	------	173,400	$1,589	12,650	104
Bluefish	10,000	$750	--------	------	41,000	2,217	158,295	20,829
Bonito	--------	------	--------	------	--------	------	57,439	4,221
Butterfish	--------	------	--------	------	170,605	9,962	730,515	38,755
Cod	941,737	38,875	187,970	$8,041	10,890	323	331,808	14,536
Cunner	16,000	320	--------	------	1,300	26	5,300	200
Eels	44,780	3,944	--------	------	103,100	8,385	21,812	1,139
Flounders	8,200	406	2,200	110	81,400	4,003	460,271	22,700
Grayfish	--------	------	--------	------	--------	------	7,800	156
Haddock	25,025	834	756,680	25,486	6,750	200	9,383	281
Hake	15,600	444	6,000	175	2,400	42	9,260	283
Herring, sea	--------	------	--------	------	44,125	875	113,916	1,767
Hickory shad	--------	------	--------	------	200	10	3,849	75
Mackerel	15,800	763	--------	------	104,400	5,198	890,771	37,118
Menhaden	--------	------	--------	------	16,800	168	560	10
Mullet	--------	------	--------	------	1,000	40	7,392	258
Pollock	104,960	751	5,500	100	--------	------	64,466	1,644
Scup	--------	------	--------	------	253,840	12,673	1,371,750	62,601
Sea bass	--------	------	--------	------	155	13	35,579	2,148
Sea robin	--------	------	--------	------	87,450	1,085	101,978	1,230
Shad	--------	------	--------	------	347	67	676	112
Sharks	--------	------	--------	------	3,400	70	9,580	146
Skates	6,000	120	--------	------	--------	------	27,800	556
Skipper or "billfish"	--------	------	--------	------	--------	------	6,068	1,248
Smelt	--------	------	--------	------	975	180	--------	------
Squeteague or "sea trout," gray	12,100	1,224	--------	------	68,540	8,028	44,825	4,214
Striped bass	475	95	--------	------	3,580	568	23,762	4,447
Sturgeon	--------	------	--------	------	--------	------	1,234	197
Tautog	144,125	7,238	--------	------	88,900	4,339	62,610	2,865
Tomcod	--------	------	--------	------	21,000	270	--------	------
Tuna or "horse mackerel"	14,000	1,020	--------	------	--------	------	10,180	881
White perch	--------	------	--------	------	3,900	458	200	20
Whiting	--------	------	--------	------	292,550	2,778	1,360,387	18,528
Squid	--------	------	--------	------	152,150	4,021	1,393,752	37,855
Total	1,358,802	56,784	958,350	33,912	1,734,157	67,587	7,370,627	281,927

Fisheries of Rhode Island, 1930—Continued

CATCH: BY GEAR—Continued

Species	Fyke nets		Dip nets		Otter trawls		Box traps	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod					80, 547	$3, 044		
Cunner			65, 000	$1, 950				
Eels	14, 500	$1, 450						
Flounders	13, 000	580			4, 115, 500	118, 173		
Grayfish					1, 100	11		
Haddock					88, 490	3, 320		
Hake					29, 600	780		
Herring, sea							56, 670	$425
Scup					20, 000	1, 000		
Sea robin					4, 500	45		
Shad							3, 280	522
Skates					646, 550	5, 841		
Swordfish					3, 000	500		
Tautog	14, 000	700						
White perch							18, 000	1, 800
Whiting					264, 350	5, 036		
Scallops, bay			811	276				
Total	41, 500	2, 730	65, 811	2, 226	5, 253, 637	137, 750	77, 950	2, 747

Species	Pots						Harpoons	
	Eel		Lobster		Periwinkle			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels	114, 235	$11, 122	5, 550	$658				
Swordfish							606, 899	$89, 609
Crabs, hard			166, 562	5, 256				
Lobsters			1, 353, 107	313, 550				
Periwinkles			233, 460	25, 940	78, 750	$8, 740		
Total	114, 235	11, 122	1, 758, 679	345, 404	78, 750	8, 740	606, 899	89, 609

Species	Spears		Dredges					
			Clam		Oyster		Scallop	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels	25, 975	$2, 796						
Clams:								
Hard, public			20, 460	$3, 345				
Hard, private			56, 100	10, 200	62, 453	$16, 605		
Oysters:								
Market, private, spring					1, 531, 592	339, 887		
Market, private, fall					1, 832, 128	392, 709		
Seed, private, spring					298, 500	40, 750		
Scallops, bay							93, 499	$40, 348
Total	25, 975	2, 796	76, 560	13, 545	3, 724, 673	789, 951	93, 499	40, 348

Species	Tongs		Rakes		Forks		Hoes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:										
Hard, public	1, 329, 064	$262, 906	275, 803	$51, 423					1, 100	$200
Hard, private	103, 895	20, 700								
Soft, public					20, 700	$4, 527	7, 740	$1, 915		
Oysters:										
Market, public, spring			8, 944	2, 650						
Market, public, fall			8, 944	2, 650					135	20
Seed, public, spring	6, 000	1, 000							23	2
Seed, public, fall									361	47
Total	1, 438, 959	284, 606	293, 691	56, 723	20, 700	4, 527	7, 740	1, 915	1, 619	269

Fisheries of Rhode Island, 1930—Continued

OPERATING UNITS: BY COUNTIES

Item	Bristol	Kent	Newport	Providence	Washington
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	29	3	256	31	37
On boats and shore—					
Regular	78	235	320	72	165
Casual	63	120	118	44	58
Total	170	358	694	147	260
Vessels:					
Steam—					
5 to 10 tons	------	------	1	------	------
11 to 20 tons	------	------	3	------	------
21 to 30 tons	------	------	------	1	------
41 to 50 tons	------	------	2	1	------
51 to 60 tons	------	------	------	1	------
Total	------	------	6	3	------
Net tonnage	------	------	139	126	------
Motor—					
5 to 10 tons	3	------	40	------	7
11 to 20 tons	5	1	11	1	3
21 to 30 tons	1	------	1	------	------
51 to 60 tons	------	------	------	1	------
Total	9	1	52	2	10
Net tonnage	126	11	447	75	88
Total vessels	9	1	58	5	10
Total net tonnage	126	11	586	201	88
Boats:					
Motor	34	178	238	23	105
Other	108	225	140	94	106
Accessory boats	7	1	109	31	12
Apparatus:					
Purse seines—					
Mackerel	------	------	3	------	1
Length, yards	------	------	360	------	200
Other	------	------	1	------	------
Length, yards	------	------	320	------	------
Haul seines	------	------	1	16	10
Length, yards	------	------	300	1, 775	1, 025
Gill nets—					
Drift	------	2	159	------	------
Square yards	------	2, 400	57, 240	------	------
Runaround	------	------	10	------	2
Square yards	------	------	2, 100	------	22, 000
Lines—					
Hand	8	5	307	12	100
Hooks	16	3	392	12	164
Trawl	------	------	1, 113	------	80
Hooks	------	------	52, 550	------	4, 000
Pound nets	------	1	43	------	18
Floating traps	------	------	45	------	17
Fyke nets	------	35	------	------	5
Dip nets	3	------	14	------	------
Otter trawls	1	------	47	------	18
Yards at mouth	30	------	1, 339	------	455
Box traps	2	------	------	2	------
Pots—					
Eel	245	390	345	225	810
Lobster	1, 822	1, 080	24, 736	138	11, 389
Periwinkle or cockle	225	------	425	------	225
Harpoons, swordfish	------	------	44	------	5
Spears	1	7	------	8	21
Dredges—					
Clam	------	3	3	------	------
Yards at mouth	------	1	3	------	------
Oyster	16	2	------	10	4
Yards at mouth	24	3	------	16	6
Scallop	69	319	24	------	120
Yards at mouth	54	250	17	------	93
Tongs	106	252	33	87	45
Rakes	5	72	48	1	30
Forks	5	------	------	------	8
Hoes	4	1	------	5	------

Fisheries of Rhode Island, 1930—Continued

CATCH: BY COUNTIES

Species	Bristol		Kent		Newport		Providence		Washington	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Albacore	-----	-----	-----	-----	34, 759	$703	-----	-----	-----	-----
Alewives	-----	-----	-----	-----	66, 050	493	-----	-----	120, 000	$1, 200
Bluefish	-----	-----	3, 000	$360	173, 745	22, 950	-----	-----	66, 550	6, 206
Bonito	-----	-----	-----	-----	56, 389	4, 127	-----	-----	1, 050	94
Butterfish	-----	-----	-----	-----	776, 065	38, 291	-----	-----	125, 055	10, 426
Cod	1, 400	$42	-----	-----	1, 409, 872	59, 130	-----	-----	141, 680	5, 647
Cunner	-----	-----	-----	-----	71, 600	2, 176	-----	-----	16, 000	320
Eels	16, 400	1, 352	50, 550	5, 146	114, 962	9, 716	229, 590	$23, 894	83, 650	7, 126
Flounders	2, 000	60	12, 000	550	3, 418, 921	93, 459	-----	-----	1, 267, 650	52, 903
Grayfish	-----	-----	-----	-----	1, 300	15	-----	-----	7, 600	152
Haddock	-----	-----	-----	-----	877, 028	29, 826	-----	-----	9, 300	295
Hake	-----	-----	-----	-----	33, 260	944	-----	-----	29, 600	780
Herring, sea	26, 670	200	600	30	118, 441	1, 902	30, 000	225	39, 000	710
Hickory shad	-----	-----	-----	-----	4, 049	85	-----	-----	-----	-----
Mackerel	-----	-----	-----	-----	1, 272, 571	45, 958	-----	-----	139, 000	5, 698
Menhaden	-----	-----	-----	-----	121, 160	929	-----	-----	11, 000	110
Mullet	-----	-----	-----	-----	8, 392	298	-----	-----	-----	-----
Pollock	-----	-----	-----	-----	68, 046	1, 569	-----	-----	106, 880	926
Scup	-----	-----	-----	-----	1, 346, 590	61, 663	-----	-----	299, 000	14, 610
Sea bass	-----	-----	-----	-----	35, 734	2, 161	-----	-----	-----	-----
Sea robin	-----	-----	-----	-----	70, 928	885	-----	-----	123, 000	1, 475
Shad	1, 800	288	-----	-----	673	127	1, 480	234	350	52
Sharks	-----	-----	-----	-----	11, 480	186	-----	-----	1, 500	30
Skates	-----	-----	-----	-----	302, 550	3, 296	-----	-----	377, 800	3, 221
Skipper or "bill-fish"	-----	-----	-----	-----	6, 068	1, 248	-----	-----	-----	-----
Smelt	-----	-----	-----	-----	975	180	-----	-----	50, 000	7, 500
Squeteague or "sea trout," gray	-----	-----	820	99	49, 745	4, 665	-----	-----	90, 580	10, 652
Striped bass	-----	-----	-----	-----	21, 342	4, 028	-----	-----	38, 475	6, 842
Sturgeon	-----	-----	-----	-----	1, 234	197	-----	-----	-----	-----
Suckers	-----	-----	-----	-----	-----	-----	-----	-----	7, 600	152
Swordfish	-----	-----	-----	-----	545, 099	80, 929	-----	-----	64, 800	9, 180
Tautog	11, 350	550	14, 200	708	160, 085	7, 499	-----	-----	124. 000	6, 385
Tomcod	-----	-----	-----	-----	6, 000	120	-----	-----	16, 600	182
Tuna or "horse-mackerel"	-----	-----	-----	-----	24, 180	1, 901	-----	-----	-----	-----
White perch	10, 000	1, 000	-----	-----	6, 100	678	8, 000	800	25, 600	2, 560
Whiting	-----	-----	-----	-----	1, 490, 537	20, 002	-----	-----	426, 750	6, 440
Crabs, hard	49, 335	1, 416	-----	-----	117, 227	3, 840	-----	-----	-----	-----
Lobsters	44, 458	10, 571	22, 744	5, 323	991, 570	224, 591	779	187	293, 556	72, 878
Squid	-----	-----	-----	-----	772, 902	25, 426	-----	-----	773, 000	16, 450
Clams:										
Hard, public	182, 765	33, 430	1, 013, 639	201, 416	126, 533	18, 935	176, 440	35, 555	127, 050	28, 538
Hard, private	126, 528	28, 255	56, 100	10, 200	-----	-----	39, 820	9, 050	-----	-----
Soft, public	6, 540	1, 227	600	200	-----	-----	6, 300	1, 575	15, 000	3, 440
Oysters:										
Market, public, spring	-----	-----	-----	-----	-----	-----	-----	-----	8, 944	2, 650
Market, public, fall	135	20	-----	-----	-----	-----	-----	-----	8, 944	2, 650
Market, private, spring	775, 757	186, 082	16, 875	3, 375	-----	-----	553, 024	114, 930	185, 936	35, 500
Market, private, fall	675, 959	160, 209	16, 875	3, 375	-----	-----	767, 422	158, 125	371, 872	71, 000
Seed, public, spring	6, 000	1, 000	-----	-----	23	2	-----	-----	-----	-----
Seed, public, fall	338	45	-----	-----	23	2	-----	-----	-----	-----
Seed, private, spring	298, 500	40, 750	-----	-----	-----	-----	-----	-----	-----	-----
Periwinkles	50, 094	5, 566	-----	-----	259, 686	28, 854	-----	-----	2, 430	260
Scallops, bay	5, 532	1, 619	42, 832	19, 850	14, 446	4, 280	-----	-----	31, 500	14, 875
Total	2, 291, 561	473, 682	1, 250, 835	250, 632	14, 988, 340	808, 266	1, 812, 855	344, 575	5, 628, 302	410, 115

Industries related to the fisheries of Rhode Island, 1930

TRANSPORTING

Item	Bristol County	Kent County	Newport County	Washington County	Total
	Number	*Number*	*Number*	*Number*	*Number*
Persons engaged on vessels	3	2	10	4	19
Vessels, motor:					
5 to 10 tons	1	1	2	1	5
11 to 20 tons			1		1
Total	1	1	3	1	6
Net tonnage	7	7	34	7	55

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Bristol County	Kent County	Newport County	Providence County	Washington County	Total
Establishments	8	8	6	9	3	34
Persons engaged:						
Proprietors	6	9	6	7		28
Salaried employees	14	3	13	21	7	58
Wage earners—						
Average for season	81	25	12	160	50	328
Average for year	55	17	7	109	30	218
Paid to salaried employees	$19,136	$3,625	$18,760	$62,351	$15,600	$119,472
Paid to wage earners	58,052	26,918	8,000	124,476	35,410	252,856
Total, salaries and wages	77,188	30,543	26,760	186,827	51,010	372,328

PRODUCTS MANUFACTURED

Item	Quantity	Value
Marine-shell novelties	(1)	$49,454
Oysters, fresh-shucked ... gallons	345,310	873,659
Miscellaneous [2]	(1)	368,112
Total		1,291,225

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 401]

Scallops, bay, fresh-shucked ... gallons	8,839	$37,331

[1] Data not available.

[2] Includes the value of oyster-shell products; fresh-shucked, hard and soft clams; and canned hard clam chowder.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons employed on transporting craft, 5 have also been included as fishermen, and among the total persons engaged in the preparation of fishermen's manufactured products, 170 have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

CONNECTICUT

Fisheries of Connecticut, 1930

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets		Lines	
	Mackerel	Menhaden		Anchor	Drift	Hand	Trawl
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	47	60				21	57
On boats and shore—							
Regular	4		16	4		67	13
Casual			83	5	62		
Total	51	60	99	9	62	88	70
Vessels:							
Steam—							
101 to 110 tons		1					
161 to 170 tons		1					
Total		2					
Net tonnage		268					
Motor—							
5 to 10 tons	2					2	
11 to 20 tons	2						
21 to 30 tons	1						1
41 to 50 tons	1					1	1
51 to 60 tons							1
61 to 70 tons	1						1
Total	7					3	4
Net tonnage	171					63	185
Boats:							
Motor	2		6	6	26	50	7
Other	2		29		10	3	
Accessory boats	14	2					41
Apparatus:							
Number	9	2	28	32	230	288	1, 726
Length, yards	1, 620	720	2, 710				
Square yards				5, 370	22, 770		
Hooks, baits, or snoods						297	84, 380

Item	Pound nets	Floating traps	Fyke nets	Otter trawls	Pots		
					Crab	Eel	Lobster
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				527		4	4
On boats and shore—							
Regular	12	5	7	98	4	31	180
Casual			6			1	
Total	12	5	13	625	4	36	184
Vessels:							
Steam—							
121 to 130 tons				2			
161 to 170 tons				3			
171 to 180 tons				1			
181 to 190 tons				1			
201 to 210 tons				11			
261 to 270 tons				1			
Total				19			
Net tonnage				3, 675			
Motor—							
5 to 10 tons				27		1	2
11 to 20 tons				18			
21 to 30 tons				1			
31 to 40 tons				1			
Total				47		1	2
Net tonnage				514		10	12
Total vessels				66		1	2
Total net tonnage				4, 189		10	12
Boats:							
Motor	8	4	1	57	2	5	160
Other	1		11			25	6
Apparatus:							
Number	11	8	107	132	160	808	16, 505
Yards at mouth				3, 274			

Fisheries of Connecticut, 1930—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Harpoons	Spears	Dredges, oyster	Tongs	Rakes	Forks	Hoes	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	45		304	2				952
On boats and shore—								
Regular	16	40	12	142	30	64	6	426
Casual								152
Total	61	40	316	144	30	64	6	1,530
Vessels:								
Steam—								
11 to 20 tons			1					1
51 to 60 tons			1					1
61 to 70 tons			2					2
71 to 80 tons			1					1
91 to 100 tons			2					2
101 to 110 tons			1					2
111 to 120 tons			1					1
121 to 130 tons								2
131 to 140 tons			1					1
161 to 170 tons								4
171 to 180 tons								1
181 to 190 tons								1
201 to 210 tons								11
261 to 270 tons								1
311 to 320 tons			1					1
391 to 400 tons			1					1
Total			12					33
Net tonnage			1,534					5,477
Motor—								
5 to 10 tons	5		26	1				54
11 to 20 tons	3		10					28
21 to 30 tons	2		7					9
31 to 40 tons	1		4					5
41 to 50 tons			3					4
51 to 60 tons								1
61 to 70 tons								1
Total	11		50	1				102
Net tonnage	153		781	6				1,490
Sail—								
5 to 10 tons			2					2
11 to 20 tons			1					1
Total			3					3
Net tonnage			25					25
Total vessels	11		65	1				138
Total net tonnage	153		2,340	6				6,992
Boats:								
Motor	8	2	8	8		8		237
Other		28		106	21	43	6	218
Accessory boats	11							62
Apparatus:								
Number	19	40	242	144	30	64	6	
Yards at mouth			241					

Fisheries of Connecticut, 1930—Continued

CATCH: BY GEAR

Species	Purse seines				Haul seines		Gill nets			
	Mackerel		Menhaden				Anchor		Drift	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	20, 974	$2, 933					700	$76		
Bonito	116	13								
Butterfish	2, 000	200					200	20		
Carp					13, 060	$1, 356	3, 500	420		
Croaker	10, 780	434								
Mackerel	606, 070	23, 636								
Menhaden			1, 569, 800	$15, 698						
Minnows					29, 035	2, 672				
Mummichog					7, 134	713				
Scup	283, 452	5, 567								
Shad					21, 722	3, 523	2, 250	446	29, 970	$6, 126
Smelt					7, 900	1, 823				
Squeteague or "sea trout," gray	23, 754	659					1, 500	275		
Striped bass							500	50		
Suckers					29, 260	2, 181				
Whiting	2, 500	10								
Total	949, 646	33, 452	1, 569, 800	15, 698	108, 111	12, 268	8, 650	1, 287	29, 970	6, 126

Species	Lines				Pound nets		Floating traps		Fyke nets	
	Hand		Trawl							
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives							1, 000	$30		
Bluefish	221, 066	$28, 307			8, 711	$1, 339	200	15		
Butterfish					6, 738	897	3, 100	341		
Carp									1, 435	$170
Cod			86, 400	$2, 592						
Dolphin			138	8						
Eels			22, 250	2, 269	7, 458	1, 119			4, 150	790
Flounders					11, 036	594	7, 100	426		
Haddock			46, 550	1, 862						
Hake			11, 807	283						
Halibut			7, 755	1, 132						
Mackerel					3, 912	521				
Menhaden					3, 000	30	860	34	2, 000	100
Minnows									1, 000	50
Pike or pickerel									275	41
Pollock	2, 000	80								
Scup					2, 000	130				
Sea bass	13, 833	2, 075	400	24	20	4				
Sea robin					500	3				
Skates			3, 065	41	2, 000	20				
Smelt							2, 000	300		
Squeteague or "sea trout," gray	804	120			4, 994	938	12, 200	1, 830		
Striped bass					138	35	1, 000	100		
Suckers									39, 760	3, 082
Swordfish			1, 619	244						
Tautog	128, 324	9, 573			3, 021	178	4, 200	336		
Tilefish			1, 783, 456	97, 068						
Yellow perch									700	105
Squid					10, 700	225				
Total	366, 027	40, 155	1, 963, 440	105, 523	64, 228	6, 033	31, 660	3, 412	49, 320	4, 338

Fisheries of Connecticut, 1930—Continued

CATCH: BY GEAR—Continued

Species	Otter trawls		Pots					
			Crab		Eel		Lobster	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Butterfish	24, 141	$2, 315						
Cod	8, 828, 829	256, 577						
Cusk	65, 241	960						
Eels	4, 733	299			64, 884	$9, 651		
Flounders	11, 146, 070	363, 458						
Haddock	48, 026, 124	1, 670, 757						
Hake	1, 125, 895	24, 929						
Halibut	175, 155	32, 340						
Mackerel	5, 644	209						
Pollock	543, 366	12, 439						
Rosefish	3, 528	25						
Sea robin	40, 556	204						
Skates	278, 768	2, 291						
Swordfish	1, 875	225						
Tomcod					200	60		
Wolffish	36, 856	501						
Crabs, hard	1, 188	9	202, 340	$4, 047				
Lobsters	1, 201	313					733, 511	$229, 953
Total	70, 309, 170	2, 367, 851	202, 340	4, 047	65, 084	9, 711	733, 511	229, 953

Species	Harpoons		Spears		Dredges, oyster		Tongs	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels			35, 254	$3, 879				
Swordfish	220, 802	$35, 199						
Tuna or "horse mackerel"	5, 400	324						
Clams, hard, public							13, 940	$7, 020
Oysters:								
Market, public, spring							5, 135	1, 745
Market, public, fall							21, 741	3, 825
Market, private, spring					3, 032, 230	$423, 439		
Market, private, fall					2, 543, 110	386, 450	13, 495	3, 075
Seed, public, spring					301, 805	41, 405	203, 000	29, 000
Seed, public, fall					452, 886	50, 875	315, 700	37, 225
Seed, private, spring					3, 709, 741	556, 963		
Seed, private, fall					561, 176	77, 542		
Total	226, 202	35, 523	35, 254	3, 879	10, 600, 948	1, 536, 674	573, 011	81, 890

Species	Rakes		Forks		Hoes	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:						
Hard, public	800	$400	1, 888	$764	800	$400
Soft, public	27, 150	5, 430	37, 905	6, 224	6, 675	1, 335
Oysters:						
Seed, public, spring	14, 000	2, 000				
Seed, public, fall	36, 820	4, 208				
Total	78, 770	12, 038	39, 793	6, 988	7, 475	1, 735

OPERATING UNITS: BY COUNTIES

Item	Fairfield	Hartford	Middlesex	New Haven	New London
	Number	*Number*	*Number*	*Number*	*Number*
Fishermen:					
On vessels	187			188	577
On boats and shore—					
Regular	126		50	69	181
Casual	15	57	61		19
Total	328	57	111	257	777

Fisheries of Connecticut, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Fairfield	Hartford	Middlesex	New Haven	New London
	Number	*Number*	*Number*	*Number*	*Number*
Vessels:					
Steam—					
11 to 20 tons	1				
51 to 60 tons	1				
61 to 70 tons	1			1	
71 to 80 tons	1				
91 to 100 tons	1			1	
101 to 110 tons				1	1
111 to 120 tons	1				
121 to 130 tons					2
131 to 140 tons	1				
161 to 170 tons					4
171 to 180 tons					1
181 to 190 tons					1
201 to 210 tons				1	10
261 to 270 tons				1	
311 to 320 tons				1	
391 to 400 tons				1	
Total	7			7	19
Net tonnage	556			1, 455	3, 466
Motor—					
5 to 10 tons	25			10	19
11 to 20 tons	5			7	16
21 to 30 tons	3			4	2
31 to 40 tons	2			2	1
41 to 50 tons	3				1
51 to 60 tons					1
61 to 70 tons					1
Total	38			23	41
Net tonnage	531			348	611
Sail—					
5 to 10 tons	2				
11 to 20 tons	1				
Total	3				
Net tonnage	25				
Total vessels	48			30	60
Total net tonnage	1, 112			1, 803	4, 077
Boats:					
Motor	29	4	44	41	119
Other	84	17	33	31	53
Accessory boats	1				61
Apparatus:					
Purse seines—					
Mackerel					9
Length, yards					1, 620
Menhaden					2
Length, yards					720
Haul seines	3	10	8	4	3
Length, yards	250	1, 200	850	180	230
Gill nets—					
Anchor			30		2
Square yards			2, 970		2, 400
Drift		6	180		44
Square yards		594	17, 820		4, 356
Lines—					
Hand	22		73	20	173
Hooks	30		74	20	173
Trawl					1, 726
Hooks					84, 380
Pound nets				1	10
Floating traps					8
Fyke nets		56	16	12	23
Otter trawls	11		11	19	91
Yards at mouth	230		220	410	2, 414
Pots—					
Crab					160
Eel	141		40	262	365
Lobster	2, 565		1, 485	3, 640	8, 815
Harpoons, swordfish	1		1		17
Spears	12			5	23
Dredges, oyster	185			57	
Yards at mouth	166			75	
Tongs	81		19	19	25
Rakes	18			12	
Forks	3		4	9	48
Hoes				6	

Fisheries of Connecticut, 1930—Continued

CATCH: BY COUNTIES

Species	Fairfield		Hartford		Middlesex		New Haven		New London	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives									1, 000	$30
Bluefish	890	$178			40, 841	$6, 126	4, 329	$880	205, 600	25, 486
Bonito									116	13
Butterfish							6, 420	715	29, 759	3, 058
Carp			4, 660	$466	12, 000	1, 320			1, 335	160
Cod	5, 000	350					381, 125	11, 363	8, 529, 104	247, 456
Croaker									10, 780	434
Cusk							4, 011	123	61, 230	837
Dolphin									138	8
Eels	27, 100	3, 055	2, 100	315	6, 500	1, 100	25, 229	3, 822	77, 800	9, 715
Flounders	343, 600	17, 181			173, 355	8, 963	752, 070	31, 836	9, 895, 181	306, 498
Haddock							4, 660, 167	155, 981	43, 412, 507	1, 516, 638
Hake							79, 581	2, 696	1, 058, 121	22, 516
Halibut							9, 588	2, 034	173, 322	31, 438
Mackerel							205	15	615, 421	24, 351
Menhaden							2, 000	100	1, 573, 660	15, 762
Minnows					25, 000	2, 000	3, 750	665	1, 285	57
Mummichog					2, 134	213	5, 000	500		
Pike or pickerel									275	41
Pollock					2, 000	80	88, 689	1, 965	454, 677	10, 474
Rosefish							3, 528	25		
Scup									285, 452	5, 697
Sea bass	13, 333	2, 000					520	79	400	24
Sea robin									41, 056	207
Shad			19, 590	3, 188	28, 141	5, 600			6, 211	1, 307
Skates	15, 804	210					58, 430	794	209, 599	1, 342
Smelt	5, 500	1, 375							4, 400	748
Squeteague or "sea trout," gray					804	120	300	60	42, 148	3, 642
Striped bass									1, 638	185
Suckers			26, 140	2, 090	36, 500	2, 790			6, 380	383
Swordfish	18, 667	2, 800			1, 500	225	1, 875	225	202, 254	32, 418
Tautog	17, 084	1, 492			17, 540	1, 161	6, 621	529	94, 300	6, 905
Tilefish									1, 783, 456	97, 068
Tomcod	200	60								
Tuna or "horse mackerel"									5, 400	324
Whiting									2, 500	10
Wolffish							5, 356	78	31, 500	423
Yellow perch									700	105
Crabs, hard									203, 528	4, 056
Lobsters	84, 970	33, 147			68, 910	24, 118	126, 004	46, 482	454, 828	126, 519
Squid									10, 700	225
Clams:										
Hard, public	6, 460	3, 280					9, 528	4, 764	1, 440	540
Soft, public	6, 000	1, 200			1, 725	345	36, 525	7, 305	27, 480	4, 139
Oysters:										
Market, public, spring									5, 135	1, 745
Market, public, fall					17, 243	2, 925	4, 498	900		
Market, private, spring	2, 660, 949	360, 284					371, 281	63, 155		
Market, private, fall	1, 702, 427	245, 027			2, 249	450	851, 929	144, 048		
Seed, public, spring	508, 305	70, 905					10, 500	1, 500		
Seed, public, fall	792, 806	90, 508					12, 600	1, 800		
Seed, private, spring	2, 278, 283	308, 977					1, 431, 458	247, 986		
Seed, private, fall	279, 076	33, 567					282, 100	43, 975		
Total	8, 766, 454	1, 175, 602	52, 490	6, 059	436, 442	57, 536	9, 235, 208	776, 400	69, 521, 816	2, 502, 984

Industries related to the fisheries of Connecticut, 1930

TRANSPORTING

Item	Fairfield County	New Haven County	Total
	Number	*Number*	*Number*
Persons engaged on vessels	45	27	72
Vessels:			
Steam—			
11 to 20 tons		1	1
61 to 70 tons	1	1	2
Total	1	2	3
Net tonnage	65	85	150
Motor—			
5 to 10 tons	5		5
11 to 20 tons	1	3	4
21 to 30 tons	1		1
31 to 40 tons		1	1
41 to 50 tons	1		1
111 to 120 tons	1		1
Total	9	4	13
Net tonnage	178	127	305
Total vessels	10	6	16
Total net tonnage	243	212	455

WHOLESALE AND MANUFACTURING

Operating Units, Salaries, and Wages

Item	Fairfield County	New London County	New Haven County	Tolland County	Total
Establishments:	7	9	11	6	33
Persons engaged:					
Proprietors	9	6	14	11	40
Salaried employees	7	30	10	6	53
Wage earners—					
Average for season	87	310	166	340	903
Average for year	54	291	75	274	694
Paid to salaried employees	$42,908	$105,636	$68,926	$38,121	$255,591
Paid to wage earners	69,697	363,595	87,649	273,788	794,729
Total salaries and wages	112,605	469,231	156,575	311,909	1,050,320

Products Manufactured

Item	Quantity	Value
Marine-shell buttons gross	1,315,173	$980,651
Oysters, fresh-shucked gallons	226,297	563,674
Miscellaneous [1]	(2)	1,172,564
Total		2,716,889

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[1] Includes fresh haddock fillets; frozen cod, flounder, haddock, hake, halibut, pollock, and salmon fillets frozen whiting sticks; smoked haddock fillets; frozen scallops; menhaden products; oyster-shell products fish meal; and marine-shell novelties.

[2] Data not available.

NOTE.—Of the total number of persons employed on transporting craft, 3 have also been included as fishermen. This fact should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

VESSEL FISHERIES AT THE PRINCIPAL NEW ENGLAND PORTS [5]

ECONOMIC ASPECT

The landings of fishery products at the three principal New England ports (Boston and Gloucester, Mass., and Portland, Me.), by vessels of 5 net tons and over, during 1931, amounted to 263,684,584 pounds as landed, valued at $9,249,257. This is a decrease of 25 per cent in the quantity of the catch as compared with 1930, and a decrease of 28 per cent in the value of the catch. Of the total landings, 99 per cent consisted of fresh fish and 1 per cent of salted fish. The landings at Boston accounted for the largest amount landed at the three ports in 1931, accounting for 219,945,003 pounds, valued at $7,906,494, or 84 per cent of the total quantity. This is a decrease of 23 per cent in amount and 27 per cent in value as compared with 1930. Landings at Gloucester in 1931 amounted to 24,849,803 pounds, valued at $775,823, or 9 per cent of the total quantity. This is a decrease of 48 per cent in amount and 42 per cent in value as compared with the previous year. Landings at Portland amounted to 18,889,778 pounds, valued at $566,940, or 7 per cent of the total landings. This is an increase of 4 per cent in the quantity and less than one-half of 1 per cent in the value as compared with 1930.

Among the landings of fresh fish, haddock outranked other species in volume landed, the amount of all sizes in 1931 being 132,845,465 pounds, or 51 per cent of the total fresh fish. This is 30 per cent less than the amount landed in 1930.

Landings by fishing vessels at principal New England ports, 1931

BOSTON: BY MONTHS

Species	January		February		March	
	Pounds	Value	Pounds	Value	Pounds	Value
Cod, fresh:						
Large	1, 739, 505	$62, 786	2, 144, 428	$96, 430	5, 481, 845	$133, 137
Market	1, 805, 664	49, 367	1, 339, 248	44, 478	1, 872, 055	46, 948
Scrod	41, 390	365	500	8	5, 200	90
Haddock, fresh:						
Large	9, 433, 050	442, 167	12, 381, 077	497, 861	14, 994, 510	544, 977
Scrod	279, 905	6, 901	425, 490	10, 658	415, 707	9, 319
Hake, fresh:						
Large	759, 955	23, 717	718, 920	25, 980	616, 200	23, 758
Small	1, 500	68			4, 220	118
Pollock, fresh	608, 815	10, 763	463, 025	15, 351	357, 220	11, 031
Cusk, fresh	582, 070	13, 191	439, 020	11, 707	544, 765	11, 892
Halibut, fresh	58, 333	12, 753	170, 545	30, 547	248, 503	47, 914
Flounders, fresh	934, 110	60, 980	861, 988	53, 976	903, 553	49, 948
Other, fresh	205, 593	5, 213	236, 234	6, 067	328, 362	8, 642
Total, fresh	16, 449, 890	688, 271	19, 180, 475	793, 063	25, 772, 140	887, 774
Landed in 1930: Fresh	20, 794, 385	1, 062, 808	23, 914, 328	943, 530	29, 136, 729	1, 279, 861

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[5] With reference to the figures published in this section the reader should refer to that section in the latter part of the book entitled "Statistical survey procedure," which gives in detail methods for collecting statistics, compilation practices and conversion factors. This is most necessary for a complete understanding of the statistics presented herewith.

Landings by fishing vessels at principal New England ports, 1931—Continued

BOSTON: BY MONTHS—Continued

Species	April		May		June		July	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Cod, fresh:								
Large	2,587,710	$58,305	1,630,677	$47,205	1,805,215	$60,170	1,804,608	$55,159
Market	1,471,670	24,146	1,555,230	27,559	2,032,237	44,388	3,126,495	52,624
Scrod	10,700	113					8,200	43
Cod, salted, large			8,290	269				
Haddock, fresh:								
Large	12,892,170	243,846	9,979,125	226,675	9,058,320	271,685	7,959,060	222,,832
Scrod	476,825	4,371	291,690	2,953	400,250	4,791	332,790	3,020
Hake, fresh, large	282,190	6,067	355,905	6,780	264,430	4,760	321,280	4,168
Pollock, fresh	228,865	5,114	303,805	3,490	276,167	4,785	221,080	3,835
Cusk, fresh	263,393	4,117	316,375	4,130	68,673	1,151	50,750	682
Halibut, fresh	338,592	55,251	395,042	48,943	287,106	39,876	313,963	36,055
Mackerel, fresh	57,300	9,454	1,920,390	120,101	3,468,495	147,474	4,362,842	181,711
Flounders, fresh	700,800	23,653	985,685	21,232	603,240	19,852	520,680	20,981
Swordfish, fresh					196,575	61,059	492,542	134,085
Other, fresh	296,783	4,059	294,693	5,394	215,287	4,491	136,117	5,243
Total, fresh	19,606,998	438,496	18,028,617	514,462	18,675,995	664,482	19,650,407	720,438
Total, salted			8,290	269				
Grand total	19,606,998	438,496	18,036,907	514,731	18,675,995	664,482	19,650,407	720,438
Landed in 1930:								
Fresh	27,700,507	782,318	23,578,286	635,507	24,210,764	932,343	30,404,936	1,055,986
Salted							42,700	1,835
Total	27,700,507	782,318	23,578,286	635,507	24,210,764	932,343	30,447,636	1,057,821

Species	August		September		October	
	Pounds	Value	Pounds	Value	Pounds	Value
Cod, fresh:						
Large	1,309,297	$53,810	1,481,042	$61,867	1,709,983	$68,998
Market	3,059,870	61,873	2,808,421	77,700	2,776,355	84,956
Scrod	1,100	16	5,570	65	48,925	1,086
Cod, salted, large			4,400	171		
Haddock, fresh:						
Large	6,484,560	263,706	6,918,270	299,075	6,074,825	314,627
Scrod	637,253	9,654	1,357,685	26,860	2,258,550	53,013
Hake, fresh:						
Large	241,220	3,587	236,135	4,724	642,605	13,508
Small			2,000	40	5,900	97
Pollock, fresh	375,060	5,179	564,455	6,320	697,485	7,894
Cusk, fresh	102,270	1,375	181,765	3,055	208,445	4,522
Halibut, fresh	237,198	26,560	89,528	13,238	107,260	16,150
Mackerel, fresh	5,535,740	219,814	3,386,825	137,532	845,790	52,024
Mackerel, salted			3,000	120		
Flounders, fresh	432,170	18,733	680,073	30,842	998,158	42,416
Swordfish, fresh	514,416	118,402	307,332	80,952	15,027	4,976
Herring, fresh	5,700	142				
Other, fresh	118,368	4,634	65,517	3,255	109,601	6,049
Total, fresh	19,054,222	787,485	18,084,618	745,525	16,498,909	670,316
Total, salted			7,400	291		
Grand total	19,054,222	787,485	18,092,018	745,816	16,498,909	670,316
Landed in 1930:						
Fresh	24,726,124	938,855	29,723,655	929,812	20,135,688	937,819
Salted	2,000	80				
Total	24,728,124	938,935	29,723,655	929,812	20,135,688	937,819

NOTE.—The weights of fresh and salted fish given in these statistics represent the fish as landed from the vessels, and the values are those received by the fishermen. Large cod are classified as those weighing over 10 pounds; market cod, 2½ to 10 pounds; and scrod cod, 1 to 2½ pounds. Large haddock are those weighing over 2½ pounds and scrod haddock, 1 to 2½ pounds. Large hake are those weighing over 6 pounds and small hake, under 6 pounds. Only landings by vessels having a capacity of 5 net tons or greater are used in this tabulation.

Landings by fishing vessels at principal New England ports, 1931—Continued

BOSTON: BY MONTHS—Continued

Species	November		December		Total, 1931		1930	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Cod, fresh:								
Large	1, 271, 234	$54, 485	967, 085	$41, 729	23, 932, 629	$794, 081	24, 068, 140	$993, 288
Market	2, 367, 975	63, 279	1, 515, 380	42, 741	25, 730, 600	620, 059	28, 211, 846	690, 620
Scrod	74, 130	1, 222	48, 630	874	244, 345	3, 882	119, 505	2, 776
Cod, salted, large	-----	-----	-----	-----	12, 690	440	-----	-----
Haddock, fresh:								
Large	5, 474, 213	262, 073	4, 379, 165	230, 048	106, 028, 345	3, 819, 572	159, 276, 930	5, 838, 526
Scrod	3, 804, 210	66, 178	3, 578, 040	63, 892	14, 258, 395	261, 610	7, 821, 344	156, 169
Hake, fresh:								
Large	959, 845	14, 719	462, 230	11, 034	5, 860, 915	142, 802	12, 614, 249	336, 873
Small	3, 600	70	26, 200	751	43, 420	1, 144	81, 375	1, 534
Pollock, fresh	601, 580	5, 334	330, 430	4, 621	5, 027, 987	83, 717	4, 671, 009	106, 912
Cusk, fresh	296, 450	5, 101	393, 115	7, 367	3, 447, 091	68, 290	3, 411, 741	90, 134
Halibut, fresh	32, 815	7, 591	30, 941	6, 856	2, 309, 826	341, 734	2, 510, 353	432, 238
Mackerel, fresh	202, 752	13, 253	74, 918	8, 270	19, 855, 052	889, 633	23, 637, 679	870, 821
Mackerel, salted	-----	-----	-----	-----	3, 000	120	44, 700	1, 915
Flounders, fresh	1, 128, 105	38, 336	744, 925	39, 256	9, 493, 487	420, 205	13, 095, 404	596, 412
Swordfish, fresh	450	155	-----	-----	1, 526, 342	399, 629	3, 078, 274	666, 922
Herring, fresh	-----	-----	-----	-----	5, 700	142	-----	-----
Other, fresh	98, 543	3, 841	60, 081	2, 546	2, 165, 179	59, 434	2, 614, 929	85, 446
Total, fresh	16, 315, 902	535, 637	12, 611, 140	459, 985	219, 929, 313	7, 905, 934	285, 212, 778	10, 868, 671
Total, salted	-----	-----	-----	-----	15, 690	560	44, 700	1, 915
Grand total	16, 315, 902	535, 637	12, 611, 140	459, 985	219, 945, 003	7, 906, 494	285, 257, 478	10, 870, 586
Landed in 1930:								
Fresh	16, 151, 607	662, 030	14, 735, 769	707, 802	-----	-----	285, 212, 778	10, 868, 671
Salted	-----	-----	-----	-----	-----	-----	44, 700	1, 915
Total	16, 151, 607	662, 030	14, 735, 769	707, 802	-----	-----	285, 257, 478	10, 870, 586

GLOUCESTER: BY MONTHS

Species	January		February		March		April	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Cod, fresh:								
Large	154, 356	$8, 197	119, 875	$7, 585	929, 775	$22, 732	771, 155	$17, 743
Market	15, 840	431	9, 790	317	37, 875	514	128, 400	1, 884
Scrod	3, 855	42	1, 955	28	140	2	-----	-----
Cod, salted:								
Large	-----	-----	-----	-----	-----	-----	110, 610	4, 225
Market	-----	-----	-----	-----	-----	-----	6, 479	191
Haddock, fresh:								
Large	164, 030	8, 990	278, 495	12, 972	353, 505	13, 801	2, 222, 845	47, 952
Scrod	3, 695	78	7, 760	131	5, 760	107	19, 200	312
Hake, fresh, large	71, 395	1, 838	52, 910	1, 729	15, 008	358	11, 640	135
Hake, salted, large	-----	-----	-----	-----	-----	-----	275	4
Pollock, fresh	329, 905	6, 305	21, 055	800	4, 275	58	15, 740	124
Pollock, salted	-----	-----	-----	-----	-----	-----	117	2
Cusk, fresh	1, 230	23	445	9	625	13	30, 545	356
Halibut, fresh	35	4	-----	-----	18	3	4, 695	704
Flounders, fresh	99, 285	4, 545	76, 510	3, 803	74, 920	3, 796	47, 040	2, 396
Herring, salted	1, 441, 368	51, 915	-----	-----	-----	-----	-----	-----
Other, fresh	24, 292	189	18, 135	130	9, 870	102	8, 055	54
Total, fresh	867, 918	30, 642	586, 930	27, 504	1, 431, 771	41, 486	3, 259, 315	71, 660
Total, salted	1, 441, 368	51, 915	-----	-----	-----	-----	117, 481	4, 422
Grand total	2, 309, 286	82, 557	586, 930	27, 504	1, 431, 771	41, 486	3, 376, 796	76, 082
Landed in 1930:								
Fresh	2, 210, 932	93, 240	1, 774, 509	61, 639	1, 328, 629	61, 035	3, 466, 894	100, 172
Salted	1, 563, 576	58, 794	-----	-----	-----	-----	69, 015	3, 420
Total	3, 774, 508	152, 034	1, 774, 509	61, 639	1, 328, 629	61, 035	3, 535, 909	103, 592

Landings by fishing vessels at principal New England ports, 1931—Continued

GLOUCESTER: BY MONTHS—Continued

Species	May		June		July	
	Pounds	Value	Pounds	Value	Pounds	Value
Cod, fresh:						
Large	908, 545	$26, 020	359, 095	$10, 902	444, 830	$12, 122
Market	222, 546	2, 945	73, 290	1, 116	216, 635	3, 223
Scrod	100	1	175	2	400	3
Cod, salted:						
Large	246, 590	8, 627	118, 455	4, 110	107, 650	3, 722
Market	15, 140	379	17, 520	396	11, 285	266
Haddock, fresh:						
Large	650, 720	14, 016	224, 335	6, 569	430, 420	9, 222
Scrod	2, 450	20	6, 100	50	27, 545	195
Haddock, salted, large	675	10	----	----	----	----
Hake, fresh, large	12, 255	116	43, 625	711	48, 780	452
Hake, salted, large	245	5	----	----	1, 145	17
Pollock, fresh	101, 390	1, 061	51, 560	1, 142	8, 860	62
Pollock, salted	520	12	100	2	320	6
Cusk, fresh	9, 305	97	19, 450	224	26, 095	294
Cusk, salted	190	4	1, 615	31	2, 180	42
Halibut, fresh	----	----	2, 375	351	47, 789	4, 517
Halibut, salted	----	----	----	----	145	20
Mackerel, fresh	240, 145	8, 086	296, 965	11, 562	548, 090	20, 125
Mackerel, salted	----	----	10, 470	524	----	----
Flounders, fresh	1, 595	78	27, 750	807	38, 140	1, 312
Swordfish, fresh	----	----	1, 980	687	4, 593	1, 210
Other, fresh	445	9	2, 450	40	2, 685	80
Total, fresh	2, 149, 496	52, 449	1, 109, 150	34, 163	1, 844, 862	52, 817
Total, salted	263, 360	9, 037	148, 160	5, 063	122, 725	4, 073
Grand total	2, 412, 856	61, 486	1, 257, 310	39, 226	1, 967, 587	56, 890
Landed in 1930:						
Fresh	4, 892, 302	111, 667	2, 670, 552	77, 462	7, 728, 185	153, 481
Salted	279, 715	13, 380	178, 142	8, 677	175, 055	8, 358
Total	5, 172, 017	125, 047	2, 848, 694	86, 139	7, 903, 240	161, 839

Species	August		September		October		November	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Cod, fresh:								
Large	87, 295	$1, 912	258, 473	$10, 292	397, 025	$21, 774	120, 633	$5, 403
Market	86, 560	1, 320	44, 220	872	12, 735	331	46, 971	1, 202
Scrod	175	2	----	----	2, 485	48	990	29
Cod, salted:								
Large	346, 077	12, 097	61, 530	2, 153	37, 920	1, 328	----	----
Market	147, 853	3, 697	2, 175	55	1, 080	31	----	----
Scrod	5, 645	85	----	----	----	----	----	----
Haddock, fresh:								
Large	252, 630	9, 393	215, 120	8, 064	23, 660	1, 289	12, 808	783
Scrod	37, 780	362	89, 885	1, 124	2, 330	52	20	1
Haddock, salted, large	135	2	----	----	----	----	----	----
Hake, fresh:								
Large	21, 000	179	99, 880	1, 983	97, 462	1, 890	95, 940	1, 492
Small	----	----	----	----	----	----	1, 130	12
Hake, salted, large	1, 200	12	----	----	2, 235	28	----	----
Pollock, fresh	9, 575	63	56, 430	719	288, 407	3, 336	461, 951	4, 590
Pollock, salted	105	1	100	1	----	----	----	----
Cusk, fresh	27, 910	325	13, 325	161	5, 525	80	5, 525	79
Cusk, salted	765	15	----	----	55	1	----	----
Halibut, fresh	----	----	----	----	450	36	70	11
Halibut, salted	----	----	----	----	100	10	----	----
Mackerel, fresh	2, 886, 995	85, 842	1, 981, 742	67, 089	318, 899	18, 434	863, 627	45, 025
Mackerel, salted	36, 159	1, 447	5, 700	239	----	----	----	----
Flounders, fresh	39, 560	1, 512	12, 645	624	11, 850	469	5, 435	200
Swordfish, fresh	----	----	4, 047	793	----	----	----	----
Herring, fresh	----	----	----	----	79, 700	684	----	----
Other, fresh	2, 790	111	220, 500	2, 559	33, 727	1, 215	122, 736	5, 278
Total, fresh	3, 452, 270	101, 021	2, 996, 267	94, 280	1, 274, 255	49, 638	1, 737, 836	64, 105
Total, salted	537, 939	17, 356	69, 505	2, 448	41, 390	1, 398	----	----
Grand total	3, 990, 209	118, 377	3, 065, 772	96, 728	1, 315, 645	51, 036	1, 737, 836	64, 105
Landed in 1930:								
Fresh	3, 414, 305	87, 790	6, 099, 035	145, 377	2, 326, 872	83, 902	6, 222, 155	155, 392
Salted	307, 693	14, 832	779, 080	42, 792	344, 683	17, 839	----	----
Total	3, 721, 998	102, 622	6, 878, 115	188, 169	2, 671, 555	101, 741	6, 222, 155	155, 392

Landings by fishing vessels at principal New England ports, 1931—Continued

GLOUCESTER: BY MONTHS—Continued

Species	December		Total, 1931		1930	
	Pounds	Value	Pounds	Value	Pounds	Value
Cod, fresh:						
Large	119, 855	$6, 829	4, 670, 912	$151, 511	7, 145, 692	$270, 927
Market	2, 395	60	897, 257	14, 215	2, 262, 190	46, 763
Scrod	165	2	10, 440	159	21, 370	227
Cod, salted:						
Large			1, 028, 832	36, 262	1, 335, 845	71, 853
Market			201, 532	5, 015	534, 122	26, 350
Scrod			5, 645	85	201, 454	8, 704
Haddock, fresh:						
Large	18, 655	1, 042	4, 847, 223	134, 093	12, 782, 802	363, 290
Scrod	5, 225	53	207, 750	2, 485	673, 713	9, 321
Haddock, salted, large			810	12		
Hake, fresh:						
Large	26, 480	597	596, 375	11, 480	1, 613, 113	29, 252
Small			1, 130	12	17, 185	376
Hake, salted, large			5, 100	66	4, 230	79
Pollock, fresh	47, 955	1, 053	1, 397, 103	19, 313	8, 376, 338	141, 650
Pollock, salted			1, 262	24	3, 155	71
Cusk, fresh	1, 010	13	140, 990	1, 674	375, 015	5, 937
Cusk, salted			4, 805	93	18, 052	438
Halibut, fresh	37	6	55, 469	5, 632	22, 505	3, 169
Halibut, salted			245	30	2, 995	532
Mackerel, fresh	161, 910	17, 314	7, 298, 373	273, 477	9, 068, 868	255, 557
Mackerel, salted			52, 329	2, 210	33, 530	1, 271
Flounders, fresh	33, 945	1, 657	468, 675	21, 199	1, 011, 189	47, 586
Swordfish, fresh			10, 620	2, 690	2, 773	673
Herring, fresh	125, 000	3, 000	204, 700	3, 684	77, 400	774
Herring, salted	845, 508	28, 674	2, 286, 876	80, 589	1, 563, 576	58, 794
Other, fresh	9, 665	46	455, 350	9, 813	212, 355	4, 493
Total, fresh	552, 297	31, 672	21, 262, 367	651, 437	43, 662, 508	1, 179, 995
Total, salted	845, 508	28, 674	3, 587, 436	124, 386	3, 696, 959	168, 092
Grand total	1, 397, 805	60, 346	24, 849, 803	775, 823	47, 359, 467	1, 348, 087
Landed in 1930:						
Fresh	1, 528, 138	48, 838			43, 662, 508	1, 179, 995
Salted					3, 696, 959	168, 092
Total	1, 528, 138	48, 838			47, 359, 467	1, 348, 087

PORTLAND: BY MONTHS

Species	January		February		March		April	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Cod, fresh:								
Large	106, 656	$4, 485	80, 672	$3, 735	493, 045	$15, 814	1, 132, 605	$29, 013
Market	50, 156	1, 242	37, 211	1, 169	78, 022	1, 811	83, 380	1, 495
Scrod	4, 420	44	2, 535	26	2, 058	20	980	8
Haddock, fresh:								
Large	311, 374	17, 257	263, 177	12, 596	973, 882	26, 120	4, 569, 238	105, 417
Scrod	10, 782	109	8, 240	83	13, 012	128	2, 840	28
Hake, fresh:								
Large	44, 060	1, 279	16, 335	473	23, 693	682	7, 665	195
Small	101, 352	2, 762	59, 745	1, 895	41, 667	1, 089	35, 725	704
Pollock, fresh	40, 329	383	18, 726	426	23, 185	421	82, 725	621
Cusk, fresh	92, 081	2, 213	77, 347	2, 187	119, 255	2, 630	109, 670	1, 725
Halibut, fresh	582	137	361	86	4, 366	865	24, 120	3, 551
Flounders, fresh	27, 792	857	30, 190	1, 390	33, 778	908	49, 362	775
Other, fresh	43, 569	1, 015	39, 301	1, 007	49, 054	1, 082	48, 191	666
Total, fresh	833, 153	31, 783	633, 840	25, 073	1, 855, 017	51, 570	6, 146, 501	144, 198
Landed in 1930: Fresh	574, 142	26, 072	1, 456, 416	53, 711	834, 017	30, 561	2, 786, 216	67, 446

Landings by fishing vessels at principal New England ports, 1931—Continued

PORTLAND: BY MONTHS—Continued

Species	May		June		July	
	Pounds	Value	Pounds	Value	Pounds	Value
Cod, fresh:						
Large	157, 561	$4, 897	187, 154	$8, 621	264, 914	$11, 799
Market	73, 457	1, 202	16, 245	323	26, 054	552
Scrod	1, 825	16	1, 251	13	1, 030	9
Cod, salted:						
Large			4, 450	156	4, 275	146
Market			2, 340	59		
Scrod			115	2		
Haddock, fresh:						
Large	376, 912	7, 536	96, 472	4, 391	142, 704	5, 891
Scrod	2, 092	21	2, 678	24	7, 880	80
Hake, fresh:						
Large	9, 970	155	15, 035	156	6, 832	103
Small	41, 395	550	45, 222	496	51, 572	682
Pollock, fresh	45, 805	459	45, 255	428	100, 466	987
Cusk, fresh	81, 305	1, 378	6, 977	106	9, 683	117
Halibut, fresh	9, 466	1, 420	32, 764	3, 856	51, 623	6, 708
Mackerel, fresh	12, 925	777	84, 105	3, 283	88, 296	3, 783
Flounders, fresh	18, 452	611	5, 775	168	28, 502	998
Swordfish, fresh			16, 388	4, 830	90, 022	25, 061
Herring, fresh			108, 530	1, 086	400	4
Other, fresh	31, 410	673	17, 751	339	42, 466	917
Total, fresh	862, 575	19, 695	681, 602	28, 120	912, 444	57, 691
Total, salted			6, 905	217	4, 275	146
Grand total	862, 575	19, 695	688, 507	28, 337	916, 719	57, 837
Landed in 1930:						
Fresh	2, 616, 242	63, 429	1, 445, 677	44, 159	2, 626, 869	90, 496
Salted	13, 105	556			665	13
Total	2, 629, 347	63, 985	1, 445, 677	44, 159	2, 627, 534	90, 509

Species	August		September		October		November	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Cod, fresh:								
Large	246, 639	$11, 558	221, 126	$10, 674	262, 588	$11, 767	99, 001	$4, 545
Market	13, 269	265	11, 716	247	45, 565	912	41, 930	911
Scrod	1, 260	11	1, 480	13	4, 430	36	6, 900	67
Cod, salted:								
Large	9, 130	319	23, 725	889	55	2		
Market	1, 010	27	2, 700	68	20	1		
Haddock, fresh:								
Large	151, 480	7, 018	110, 959	5, 789	175, 322	9, 019	161, 996	8, 955
Scrod	7, 235	69	4, 342	44	8, 485	76	3, 136	42
Hake, fresh:								
Large	6, 210	79	16, 282	261	67, 550	958	59, 961	832
Small	53, 623	567	49, 315	815	194, 281	2, 795	161, 568	1, 928
Hake, salted, small	155	1						
Pollock, fresh	80, 037	790	109, 938	1, 054	294, 173	3, 058	188, 463	949
Pollock, salted					10			
Cusk, fresh	2, 917	49	10, 200	185	72, 745	1, 147	57, 527	786
Cusk, salted			200	3				
Halibut, fresh	58, 126	8, 665	19, 680	2, 622	2, 033	269	825	149
Mackerel, fresh	1, 420, 697	37, 146	672, 095	13, 516	12, 631	867	11, 847	649
Mackerel, salted	9, 555	113						
Flounders, fresh	38, 080	1, 006	31, 848	1, 028	37, 877	1, 204	3, 945	163
Swordfish, fresh	90, 531	20, 741	26, 426	5, 794				
Herring, fresh	47, 600	494	193, 100	1, 272	295, 200	1, 724	22, 600	90
Other, fresh	185, 383	3, 135	23, 029	403	70, 363	1, 334	42, 620	836
Total, fresh	2, 403, 087	91, 593	1, 501, 536	43, 717	1, 543, 243	35, 166	862, 319	20, 902
Total, salted	19, 850	460	26, 625	960	85	3		
Grand total	2, 422, 937	92, 053	1, 528, 161	44, 677	1, 543, 328	35, 169	862, 319	20, 902
Landed in 1930:								
Fresh	1, 431, 689	49, 859	1, 172, 065	37, 521	1, 402, 070	43, 499	1, 108, 052	30, 407
Salted	4, 900	196						
Total	1, 436, 589	50, 055	1, 172, 065	37, 521	1, 402, 070	43, 499	1, 108, 052	30, 407

Landings by fishing vessels at principal New England ports, 1931—Continued

PORTLAND: BY MONTHS—Continued

Species	December		Total, 1931		1930	
	Pounds	Value	Pounds	Value	Pounds	Value
Cod, fresh:						
Large	62, 800	$2, 717	3, 314, 761	$119, 625	1, 987, 921	$78, 428
Market	37, 111	940	514, 116	11, 069	660, 505	16, 864
Scrod	5, 195	51	33, 364	314	51, 642	540
Cod, salted:						
Large	----------	----------	41, 635	1, 512	15, 340	718
Market	----------	----------	6, 070	155	260	10
Scrod	----------	----------	115	2	----------	----------
Haddock, fresh:						
Large	96, 025	5, 859	7, 429, 541	215, 848	8, 589, 386	274, 188
Scrod	2, 679	45	73, 401	749	227, 158	4, 292
Hake, fresh:						
Large	36, 730	820	310, 323	5, 993	168, 328	3, 468
Small	103, 099	2, 201	938, 564	16, 484	1, 119, 273	23, 279
Hake, salted, small	----------	----------	155	1	----------	----------
Pollock, fresh	176, 138	1, 108	1, 205, 240	10, 684	929, 624	15, 178
Pollock, salted	----------	----------	10	----------	70	1
Cusk, fresh	31, 814	625	671, 521	13, 148	628, 607	16, 722
Cusk, salted	----------	----------	200	3	----------	----------
Halibut, fresh	750	142	204, 696	28, 470	43, 340	6, 990
Halibut, salted	----------	----------	----------	----------	2, 335	23
Mackerel, fresh	2, 825	99	2, 305, 421	60, 120	727, 176	28, 030
Mackerel, salted	----------	----------	9, 555	113	665	13
Flounders, fresh	7, 581	353	313, 182	9, 461	300, 144	7, 412
Swordfish, fresh	----------	----------	223, 367	56, 426	299, 987	58, 354
Herring, fresh	----------	----------	667, 430	4, 670	1, 081, 750	10, 657
Other, fresh	33, 974	686	627, 111	12, 093	1, 351, 014	21, 612
Total, fresh	596, 721	15, 646	18, 832, 038	565, 154	18, 165, 855	566, 014
Total, salted	----------	----------	57, 740	1, 786	18, 670	765
Grand total	596, 721	15, 646	18, 889, 778	566, 940	18, 184, 525	566, 779
Landed in 1930:						
Fresh	712, 400	28, 854	----------	----------	18, 165, 855	566, 014
Salted	----------	----------	----------	----------	18, 670	765
Total	712, 400	28, 854	----------	----------	18, 184, 525	566, 779

SUMMARY: BY PORTS

Species	Boston		Gloucester		Portland	
	Pounds	Value	Pounds	Value	Pounds	Value
Cod, fresh:						
Large	23, 932, 629	$794, 081	4, 670, 912	$151, 511	3, 314, 761	$119, 625
Market	25, 730, 600	620, 059	897, 257	14, 215	514, 116	11, 069
Scrod	244, 345	3, 882	10, 440	159	33, 364	314
Cod, salted:						
Large	12, 690	440	1, 028, 832	36, 262	41, 635	1, 512
Market	----------	----------	201, 532	5, 015	6, 070	155
Scrod	----------	----------	5, 645	85	115	2
Haddock, fresh:						
Large	106, 028, 345	3, 819, 572	4, 847, 223	134, 093	7, 429, 541	215, 848
Scrod	14, 258, 395	261, 610	207, 750	2, 485	73, 401	749
Haddock, salted, large	----------	----------	810	12	----------	----------
Hake, fresh:						
Large	5, 860, 915	142, 802	596, 375	11, 480	310, 323	5, 993
Small	43, 420	1, 144	1, 130	12	938, 564	16, 484
Hake, salted:						
Large	----------	----------	5, 100	66	----------	----------
Small	----------	----------	----------	----------	155	1
Pollock, fresh	5, 027, 987	83, 717	1, 397, 103	19, 313	1, 205, 240	10, 684
Pollock, salted	----------	----------	1, 262	24	10	----------
Cusk, fresh	3, 447, 091	68, 290	140, 990	1, 674	671, 521	13, 148
Cusk, salted	----------	----------	4, 805	93	200	3
Halibut, fresh	2, 309, 826	341, 734	55, 469	5, 632	204, 696	28, 470
Halibut, salted	----------	----------	245	30	----------	----------
Mackerel, fresh	19, 855, 052	889, 633	7, 298, 373	273, 477	2, 305, 421	60, 120
Mackerel, salted	3, 000	120	52, 329	2, 210	9, 555	113

Landings by fishing vessels at principal New England ports, 1931—Continued

SUMMARY: BY PORTS—Continued

Species	Boston		Gloucester		Portland	
	Pounds	Value	Pounds	Value	Pounds	Value
Flounders, fresh	9,493,487	$420,205	468,675	$21,199	313,182	$9,461
Swordfish, fresh	1,526,342	399,629	10,620	2,690	223,367	56,426
Herring, fresh	5,700	142	204,700	3,684	667,430	4,670
Herring, salted	----------	----------	2,286,876	80,589	----------	----------
Other, fresh	2,165,179	59,434	455,350	9,813	627,111	12,093
Total, fresh	219,929,313	7,905,934	21,262,367	651,437	18,832,038	565,154
Total, salted	15,690	560	3,587,436	124,386	57,740	1,786
Grand total	219,945,003	7,906,494	24,849,803	775,823	18,889,778	566,940
Landed in 1930:						
Fresh	285,212,778	10,868,671	43,662,508	1,179,995	18,165,855	566,014
Salted	44,700	1,915	3,696,959	168,092	18,670	765
Total	285,257,478	10,870,586	47,359,467	1,348,087	18,184,525	566,779

Species	Total, 1931		1930	
	Pounds	Value	Pounds	Value
Cod, fresh:				
Large	31,918,302	$1,065,217	33,201,753	$1,342,643
Market	27,141,973	645,343	31,134,541	754,247
Scrod	288,149	4,355	192,517	3,543
Cod, salted:				
Large	1,083,157	38,214	1,351,185	72,571
Market	207,602	5,170	534,382	26,360
Scrod	5,760	87	201,454	8,704
Haddock, fresh:				
Large	118,305,109	4,169,513	180,649,118	6,476,004
Scrod	14,539,546	264,844	8,722,215	169,782
Haddock, salted, large	810	12	----------	----------
Hake, fresh:				
Large	6,767,613	160,275	14,395,690	369,593
Small	983,114	17,640	1,217,833	25,189
Hake, salted:				
Large	5,100	66	4,230	79
Small	155	1	----------	----------
Pollock, fresh	7,630,330	113,714	13,976,971	263,740
Pollock, salted	1,272	24	3,225	72
Cusk, fresh	4,259,602	83,112	4,415,363	112,793
Cusk, salted	5,005	96	18,052	438
Halibut, fresh	2,569,991	375,836	2,576,198	442,397
Halibut, salted	245	30	5,330	555
Mackerel, fresh	29,458,846	1,223,230	33,433,723	1,154,408
Mackerel, salted	64,884	2,443	78,895	3,199
Flounders, fresh	10,275,344	450,865	14,406,737	651,410
Swordfish, fresh	1,760,329	458,745	3,381,034	725,949
Herring, fresh	877,830	8,496	1,159,150	11,431
Herring, salted	2,286,876	80,589	1,563,576	58,794
Other, fresh	[1] 3,247,640	81,340	4,178,298	111,551
Total, fresh	260,023,718	9,122,525	347,041,141	12,614,680
Total, salted	3,660,866	126,732	3,760,329	170,772
Grand total	263,684,584	9,249,257	350,801,470	12,785,452
Landed in 1930:				
Fresh	----------	----------	347,041,141	12,614,680
Salted	----------	----------	3,760,329	170,772
Total	----------	----------	350,801,470	12,785,452

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[1] The items under "Other" include alewives, 351,800 pounds, value $4,240; butterfish, 122,571 pounds, value $9,482; eels, 10,565 pounds, value $159; cunner ("perch"), 675 pounds, value $18; rosefish, 120,287 pounds, value $1,152; salmon, 54 pounds, value $14; sea robins, 250 pounds, value $5; scup, 780 pounds, value $78; shad, 193,095 pounds, value $7,388; sharks, 57,628 pounds, value $909; skates, 41,040 pounds, value $307; smelt, 680 pounds, value $34; sturgeon, 4,054 pounds, value $406; tuna, 247 pounds, value $25; whiting, 69,598 pounds, value $2,066; wolffish, 1,773,935 pounds, value $40,669; lobsters, 192 pounds, value $50; scallops, 369 pounds, value $56; spearfish, 500 pounds, value $10; goosefish, 150 pounds, value $2; sea bass, 2,200 pounds, value $110; livers, 403,077 pounds, value $8,402; spawn, 92,544 pounds, value $5,623; and tongues, 1,349 pounds, value $135.

BIOLOGICAL ASPECT

In 1931, the fishing fleet landing fares at Boston and Gloucester, Mass., and Portland, Me., and operating on the fishing banks of the North Atlantic from Flemish Cap to New York, numbered 427 steam, motor, and sail vessels, of over 5 net tons, as measured by the United States Customs Service. These made 11,543 trips to the fishing grounds, and were absent from port 54,932 days, or an average of about 4.8 days per trip. This is 0.1 of a day less than the average length of a trip during 1930. Their catches of edible fish landed at the three ports amounted to 266,037,858 pounds when the salted fish had been converted to the basis of fresh gutted or round fish as landed. This does not represent the entire catch of edible fish of these vessels, for small quantities, estimated at not more than 5 per cent of their total catch, were landed at ports in New England other than these three, at New York City, and at ports in New Jersey.

Otter trawls on all sizes of vessels accounted for 153,566,035 pounds, or 58 per cent of the total catch. Line trawls were next in importance, accounting for 62,619,353 pounds, or 24 per cent of the total catch landed at the three ports in 1931.

The catch taken on Georges Bank was considerably larger than that taken on any other fishing ground and landed at the three ports in 1931. It amounted to 100,142,605 pounds, or 38 per cent of the total catch. It was taken mainly by otter trawls. The grounds near the shore, Browns Bank, and South Channel were next in importance, each accounting for about 15 per cent of the total catch. The catch on the grounds near the shore was taken mainly in purse seines; that on Browns Bank, mainly by line trawls; and that on South Channel, largely by otter trawls.

Landings by fishing vessels at the three principal New England ports, 1931

BY GEAR AND FISHING GROUNDS

Gear and fishing ground	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake	
				Large	Market	Scrod	Large	Scrod	Large	Small
	Number	*Number*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Line trawls:										
Off Funks	1	1	5							
Grand Bank	5	8	183	4, 412	246				5, 239	
Green Bank	3	3	70	4, 617	1, 377					307
St. Peters Bank	3	5	113	1, 540	780					1, 470
Off Newfoundland	2	2	36							
Seal Island grounds	2	2	11	3, 020	2, 945	270	10, 420	375		10, 625
Gulf of St. Lawrence	2	2	70	575, 951	274, 671	11, 088			2, 280	
Scatari Bank	1	1	35	7, 154	2, 716					
Quereau Bank	10	14	308	73, 651	13, 302	228	1, 390		5, 276	
The Gully	3	4	79	8, 600	12, 985		40, 000			
Sable Island Bank (Western Bank)	13	18	199	557, 040	363, 740		720, 305		5, 855	
Cape Shore	36	87	944	540, 100	1, 115, 765	715	1, 816, 290	1, 005	282, 720	10, 040
Emerald Bank	1	1	8	24, 000	18, 980		38, 800			
La Have Bank	33	64	622	618, 137	859, 512	800	1, 799, 135	22, 250	82, 835	565
Roseway Bank	4	5	41	49, 210	99, 300		131, 050		10, 500	
Browns Bank	52	369	3, 696	3, 900, 442	3, 734, 621	1, 020	11, 712, 350	15, 240	645, 095	16, 820
Georges Bank	43	152	1, 771	3, 358, 937	1, 127, 438	265	2, 379, 770	45, 150	138, 474	
South Channel	38	324	2, 089	1, 871, 467	2, 943, 485	1, 780	6, 844, 420	33, 560	866, 760	4, 010
Off Highland Light	2	2	10	5, 400	6, 600		42, 900		3, 100	
Off Chatham	4	5	28	15, 265	15, 800	400	85, 500		22, 080	
Nantucket Shoals	4	12	107	26, 105	12, 025		28, 905		1, 800	
Cashes Bank	16	31	125	73, 540	40, 050	2, 475	129, 125	2, 103	127, 765	56, 630
Fippenies Bank	6	6	28	15, 580	8, 860		24, 815		28, 800	4, 395
Platts Bank	4	6	15	9, 935	4, 122	125	18, 210	540	8, 240	9, 825
Jeffreys Ledge	27	294	635	201, 914	97, 253	11, 316	881, 059	34, 910	262, 081	287, 006
Tillies Bank	1	1	8	190			3, 100	200	3, 200	
Middle Bank (Stellwagen Bank)	7	54	274	40, 575	20, 928	800	424, 735	13, 065	206, 580	4, 000
Shore, general	51	329	917	344, 425	230, 874	20, 993	817, 036	32, 961	169, 368	263, 868
Total	[1] 105	1, 802	12, 427	12, 331, 207	11, 008, 375	52, 275	27, 949, 315	201, 359	2, 878, 048	669, 561
Hand lines:										
Cape Shore	5	16	136	170, 730	358, 150		14, 185		400	
Browns Bank	6	19	184	238, 945	338, 880		36, 540		1, 050	
Georges Bank	6	30	277	622, 260	399, 860		18, 590			
South Channel	3	3	20	23, 670	15, 770		4, 900			
Off Chatham	1	1	6		1, 135		75			
Off Chatham (occasional)					776	89	278			
Nantucket Shoals	7	24	160	81, 615	157, 920		1, 620	290	10, 300	

Shore, general	4	4	27	8,175	13,190	160	1,335		2,200	
Shore, general (occasional)				908	1,610	95	40			
Total	[1] 17	97	810	1,146,303	1,287,291	344	77,563	290	13,950	
Harpoons:										
Gulf of St. Lawrence	1	1	5							
Gurdo Bank	1	1	26							
The Gully	1	1	20							
Cape Shore	4	4	79							
Browns Bank	52	67	1,224							
Georges Bank	74	191	3,512							
South Channel	1	1	7							
Off Chatham	2	2	16							
Nantucket Shoals	2	2	29							
Shore, general	8	8	127							
Total	[1] 79	278	5,045							
Otter trawls, large:										
Gulf of St. Lawrence	1	1	15	4,300	9,400		40,700	900	19,400	
Sable Island Bank (Western Bank)	38	93	1,067	1,576,640	1,389,363	35,130	6,465,365	226,080	72,330	
La Have Bank	32	59	625	489,075	680,265	19,775	2,781,660	171,805	75,945	
Browns Bank	42	105	1,042	1,338,310	794,835	5,010	8,101,157	405,640	209,850	100
Georges Bank	65	797	7,846	7,568,770	6,970,498	105,975	29,850,301	7,258,955	1,411,945	15,420
South Channel	44	204	1,864	1,067,288	1,115,635	14,420	7,887,885	1,131,368	646,025	1,500
Off Chatham	2	2	15	13,325	29,500		61,440	2,900	11,375	
Nantucket Shoals	21	27	259	88,310	143,185	3,160	1,314,010	344,560	50,680	
Shore, general	1	1	11	2,000	2,000		15,000	38,000		
Total	[1] 67	1,289	12,744	12,148,018	11,134,681	183,470	56,517,518	9,580,208	2,497,550	17,020
Otter trawls, medium:										
Sable Island Bank (Western Bank)	2	2	20	1,800	7,400		25,100	3,000	1,125	
Cape Shore	2	2	17	2,510	3,500		50,210	11,500	1,900	
La Have Bank	11	15	129	73,730	79,070	500	559,000	51,655	12,200	
Browns Bank	35	73	622	425,755	261,140	7,900	3,172,560	123,935	20,005	
Georges Bank	68	775	6,404	3,042,608	2,005,420	39,805	16,488,970	3,050,995	381,875	3,500
Clark Bank	1	1	8	1,600	250		16,500	100	1,700	
South Channel	59	345	2,759	485,390	1,055,085	10,105	6,784,597	1,024,170	322,070	1,000
Off Highland Light	1	1	4		1,725		3,200	5,800	2,400	
Off Chatham	9	25	159	44,055	62,890		329,025	54,180	23,765	
Nantucket Shoals	34	64	504	28,500	145,800		1,082,410	158,435	55,850	
Cashes Bank	1	1	5	800	1,900				3,070	
Jeffreys Ledge	4	6	31	540	515		15,895		760	
Middle Bank (Stellwagen Bank)	2	3	14	2,075	125		10,250	13,500	1,220	
South	1	1	3							
Shore, general	30	174	496	41,489	47,610	2,625	380,270	79,572	58,660	670
Total	[1] 91	1,488	11,175	4,150,852	3,672,430	60,935	28,917,987	4,576,842	886,600	5,170

[1] Exclusive of duplication.

Landings by fishing vessels at the three principal New England ports, 1931—Continued

BY GEAR AND FISHING GROUNDS—Continued

Gear and fishing ground	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake	
				Large	Market	Scrod	Large	Scrod	Large	Small
	Number	*Number*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Otter trawls, small:										
Cape Shore	1	1	7	50	200		100		800	
Browns Bank	1	1	7	2,700	3,400		33,500			
Georges Bank	6	49	383	96,445	68,845		642,760	123,025	10,500	
South Channel	3	9	73	3,840	25,525		112,800	22,770	915	
Nantucket Shoals	5	7	45	1,430	26,845		36,325	2,135	1,050	
Jeffreys Ledge	2	2	5	130	35		2,165	80		
Shore, general	59	442	1,115	69,213	49,294	1,605	633,208	31,899	87,098	38,145
Total	[1]62	511	1,635	173,808	174,144	1,605	1,460,858	179,909	100,363	38,145
Sink gill nets:										
Jeffreys Ledge	5	56	57	56,651	5,120		14,793		4,710	19,422
Shore, general	35	3,613	3,669	3,969,460	262,683	925	3,368,743	938	396,081	234,103
Total	35	3,669	3,726	4,026,111	267,803	925	3,383,536	938	400,791	253,525
Drift gill nets:										
Bay of Islands	7	8	412							
Georges Bank	1	1	4							
Jeffreys Ledge	1	3	7							
South	12	14	44							
Shore, general	84	741	1,534							
Total	[1]92	767	2,001							
Purse seines:										
Cape Shore	3	4	38							
Georges Bank	47	72	271							
South Channel	36	45	167							
Off Chatham	55	94	407							
Nantucket Shoals	22	25	75							
Middle Bank (Stellwagen Bank)	3	3	9							
South	54	91	315							
Shore, general	124	1,308	4,087							
Total	[1]127	1,642	5,369							
Grand total	[1]427	11,543	54,932	33,976,299	27,544,721	299,554	118,306,777	14,539,546	6,777,302	983,421

NOTE.—The 3 principal New England ports are Boston and Gloucester, Mass., and Portland, Me. Otter trawls (including V-D trawls) are classified according to the size of the vessel. The weight of salted fish landed has been converted to the equivalent of fresh fish as landed. Only landings by vessels having a capacity of 5 net tons or greater are used in this tabulation. "Occasional" after the name of a bank or ground indicates that the vessel or vessels contributing to the catch as shown fished chiefly with another type of gear. In such cases the number of vessels fishing, number of trips, and number of days absent are shown under the principal type of gear used.

Gear and fishing ground	Pollock	Cusk	Halibut	Flounders	Swordfish	Mackerel	Herring	Other	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Line trawls:									
Off Funks			32, 530						32, 530
Grand Bank		885	273, 825					2, 500	287, 107
Green Bank		40	65, 439						71, 780
St. Peters Bank		2, 975	214, 734						221, 499
Off Newfoundland			81, 573						81, 573
Seal Island grounds	672	6, 075	164					1, 850	36, 416
Gulf of St. Lawrence			44, 526						908, 516
Scatari Bank		1, 102	6, 117						17, 089
Quereau Bank	247	15, 360	215, 794		1, 325			2, 451	329, 024
The Gully	355	10, 125	48, 671						120, 736
Sable Island Bank (Western Bank)	14, 235	11, 525	44, 390		195			3, 040	1, 720, 325
Cape Shore	40, 365	371, 940	11, 172	350				46, 260	4, 236, 722
Emerald Bank	275	940	822						83, 817
La Have Bank	34, 800	148, 845	105, 682		203	320		19, 320	3, 692, 404
Roseway Bank	2, 100	18, 555	976					2, 375	314, 066
Browns Bank	264, 450	1, 954, 144	302, 816	4, 250	10, 862			147, 795	22, 709, 905
Georges Bank	91, 341	270, 156	585, 717	80	6, 295			16, 023	8, 019, 646
South Channel	347, 125	198, 055	26, 682	4, 825				54, 205	13, 196, 374
Off Highland Light	460	600							59, 060
Off Chatham	6, 350	2, 700	79					2, 390	150, 564
Nantucket Shoals	800	400	45, 559					262	115, 856
Cashes Bank	26, 015	210, 200	3, 707					16, 265	687, 875
Fippenies Bank	4, 230	18, 670	522					950	106, 822
Platts Bank	3, 680	7, 430	388					4, 325	66, 820
Jeffreys Ledge	58, 896	300, 076	3, 104	3, 635				110, 806	2, 252, 056
Tillies Bank	500	200							7, 390
Middle Bank (Stellwagen Bank)	13, 040	64, 520	806					6, 447	795, 496
Shore, general	63, 030	249, 261	7, 820	3, 356				94, 893	2, 297, 885
Total	972, 966	3, 864, 779	2, 123, 615	16, 496	[2] 18, 880	[2] 320		532, 157	62, 619, 353
Hand lines:									
Cape Shore	49, 455	14, 905	277					11, 595	619, 697
Browns Bank	33, 615	20, 843	3, 917					14, 320	688, 110
Georges Bank	64, 010	19, 665	8, 190					12, 720	1, 145, 295
South Channel	3, 140	800	64					1, 450	49, 794
Off Chatham									1, 210
Off Chatham (occasional)									1, 143
Nantucket Shoals	5, 840	760							258, 345
Shore, general	2, 000	1, 000						275	28, 335
Shore, general (occasional)	105								2, 758
Total	158, 165	57, 973	12, 448					40, 360	2, 794, 687

[1] Exclusive of duplication.

[2] Incidental catch.

Landings by fishing vessels at the three principal New England ports, 1931—Continued

BY GEAR AND FISHING GROUNDS—Continued

Gear and fishing ground	Pollock	Cusk	Halibut	Flounders	Swordfish	Mackerel	Herring	Other	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Harpoons:									
Grand Bank (occasional)					378				378
Green Bank (occasional)					135				135
Gulf of St. Lawrence					1,901				1,901
Gurdo Bank					4,474				4,474
Quereau Bank (occasional)					794				794
The Gully					5,567				5,567
Cape Shore					32,367				32,367
La Have Bank (occasional)					1,218				1,218
Browns Bank					519,416				519,416
Browns Bank (occasional)					2,725				2,725
Georges Bank					1,120,482			913	1,121,395
Georges Bank (occasional)					5,588				5,588
South Channel					471				471
South Channel (occasional)					144				144
Off Chatham					392				392
Nantucket Shoals					3,379				3,379
Shore, general					41,431				41,431
Shore, general (occasional)					263				263
Total					1,741,125			913	1,742,038
Otter trawls, large:									
Gulf of St. Lawrence				2,800					77,500
Sable Island Bank (Western Bank)	373,000	2,685	38,301	185,105				190,914	10,554,913
La Have Bank	170,100	12,490	26,559	157,460		100		88,653	4,673,887
Browns Bank	256,110	22,080	57,317	147,950				219,997	11,558,356
Georges Bank	2,166,135	220,865	172,725	1,955,136		9,515	5,700	638,856	58,350,796
South Channel	559,820	36,985	39,877	589,200		1,633		187,613	13,279,249
Off Chatham	4,450	100		2,850				2,580	128,520
Nantucket Shoals	44,600	600	1,535	87,405				34,265	2,112,310
Shore, general				2,000					59,000
Total	3,574,215	295,805	336,314	3,129,906		[2] 11,248	[2] 5,700	1,362,878	100,794,531
Otter trawls, medium:									
Sable Island Bank (Western Bank)	1,645		15	135					40,220
Cape Shore	1,050	800	129	1,225				390	73,214
La Have Bank	19,005	1,290	4,059	23,045				9,915	833,469
Browns Bank	48,710	3,790	10,895	86,310				70,225	4,231,225
Georges Bank	321,545	11,450	59,289	3,117,210		1,100		190,412	28,714,179
Clark Bank	2,300			585					23,035
South Channel	126,907	2,570	16,320	1,074,595		395		117,678	11,020,882
Off Highland Light	100			815				120	14,160
Off Chatham	47,660	250	458	53,025				22,620	637,928

Nantucket Shoals	8,020		2,092	463,305		50		12,866	1,957,328
Cashes Bank		15,000							20,770
Jeffreys Ledge		330		29,003				835	47,878
Middle Bank (Stellwagen Bank)				10,230				225	37,625
South				400				2,980	3,380
Shore, general	24,515	860	424	419,870				36,312	1,092,877
Total	601,457	36,340	93,681	5,279,753		[2] 1,545		464,578	48,748,170
Otter trawls, small:									
Cape Shore				15,100					16,250
Browns Bank	450		43	1,435				1,200	42,728
Georges Bank	595		3,561	340,783				4,165	1,290,679
South Channel	50		95	50,885				50	216,930
Nantucket Shoals	150			58,015				858	126,808
Jeffreys Ledge				2,605				200	5,215
Shore, general	4,412	1,910	161	1,337,392				70,387	2,324,724
Total	5,657	1,910	3,860	1,806,215				76,860	4,023,334
Sink gill nets:									
Jeffreys Ledge	121,980	477						14,201	237,354
Shore, general	2,198,307	11,827	563	42,974				276,802	10,763,406
Total	2,320,287	12,304	563	42,974				291,003	11,000,760
Drift gill nets:									
Bay of Islands							3,555,314		3,555,314
Georges Bank						9,147			9,147
Jeffreys Ledge						4,920			4,920
South						150,760		25	150,785
Shore, general						1,486,100	200	19,623	1,505,923
Shore, general (occasional)						9,290			9,290
Total						1,660,217	3,555,514	19,648	5,235,379
Purse seines:									
Cape Shore						189,784			189,784
Georges Bank						1,485,450		430	1,485,880
South Channel						1,170,885		600	1,171,485
Off Chatham						1,037,980		1,330	1,039,310
Nantucket Shoals						784,972		250	785,222
Middle Bank (Stellwagen Bank)						69,775			69,775
South						2,098,290		150	2,098,450
Shore, general					324	21,035,973	746,930	456,383	22,239,610
Total					[2] 324	27,873,109	746,930	459,153	29,079,516
Scallop drags: Shore, general (occasional)								90	90
Grand total	7,632,747	4,269,111	2,570,481	10,275,344	1,760,329	29,546,439	4,308,144	3,247,640	266,037,858

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[2] Incidental catch.

Landings by fishing vessels at the three principal New England ports, 1931—Continued

SUMMARY: BY FISHING GROUNDS

Fishing ground	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake	
				Large	Market	Scrod	Large	Scrod	Large	Small
	Number	Number	Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
East of 66° W. longitude										
Off Newfoundland:										
Off Funks	1	1	5							
Grand Bank	5	8	183	4,412	246				5,239	
Green Bank	3	3	70	4,617	1,377					307
St. Peters Bank	3	5	113	1,540	780					1,470
Bay of Islands	7	8	412							
Off Newfoundland	2	2	36							
Total	[1] 17	27	819	10,569	2,403				5,239	1,777
Off Canada:										
Seal Island grounds	2	2	11	3,020	2,945	270	10,420	375		10,625
Gulf of St. Lawrence	4	4	90	580,251	284,071	11,088	40,700	900	21,680	
Scatari Bank	1	1	35	7,154	2,716					
Gurdo Bank	1	1	26							
Quereau Bank	10	14	308	73,651	13,302	228	1,390		5,276	
The Gully	4	5	99	8,600	12,985		40,000			
Sable Island Bank (Western Bank)	52	113	1,286	2,135,480	1,760,503	35,130	7,210,770	229,080	79,310	
Cape Shore	48	114	1,221	713,390	1,477,615	715	1,880,785	12,505	285,820	10,040
Emerald Bank	1	1	8	24,000	18,980		38,800			
La Have Bank	75	138	1,376	1,180,942	1,618,847	21,075	5,139,795	245,710	170,980	565
Roseway Bank	4	5	41	49,210	99,300		131,050		10,500	
Total	[1] 125	398	4,501	4,775,698	5,291,264	68,506	14,493,710	488,570	573,566	21,230
West of 66° W. longitude										
Off United States:										
Browns Bank	166	634	6,775	5,906,152	5,132,876	13,930	23,056,107	544,815	876,000	16,920
Georges Bank	274	2,067	20,468	14,689,020	10,572,061	146,045	49,380,391	10,478,125	1,942,794	18,920
Clark Bank	1	1	8	1,600	250		16,500	100	1,700	
South Channel	180	931	6,979	3,451,655	5,155,500	26,305	21,634,602	2,211,868	1,835,770	6,510
Off Highland Light	3	3	14	5,400	8,325		46,100	5,800	5,500	
Off Chatham	71	129	631	72,645	110,101	489	476,318	57,080	57,220	
Nantucket Shoals	91	161	1,179	225,960	485,775	3,160	2,463,270	505,420	119,680	
Cashes Bank	16	32	130	74,340	41,950	2,475	129,125	2,103	130,835	56,630
Fippenies Bank	6	6	28	15,580	8,860		24,815		28,800	4,395
Platts Bank	4	6	15	9,935	4,122	125	18,210	540	8,240	9,825
Jeffreys Ledge	38	361	735	259,235	102,923	11,316	913,912	34,990	267,551	306,428
Tillies Bank	1	1	8	190			3,100	200	3,200	
Middle Bank (Stellwagen Bank)	12	60	297	42,650	21,053	800	434,985	26,565	207,800	4,000
South	65	106	362							
Shore, general	257	6,620	11,983	4,435,670	607,261	26,403	5,215,632	183,370	713,407	536,786
Total	[1] 416	11,118	49,612	29,190,032	22,251,057	231,048	103,813,067	14,050,976	6,198,497	960,414
Grand total	[1] 427	11,543	54,932	33,976,299	27,544,724	299,554	118,306,777	14,539,546	6,777,302	983,421

Fishing ground	Pollock	Cusk	Halibut	Flounders	Swordfish	Mackerel	Herring	Other	Total
East of 66° W. longitude	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Off Newfoundland:									
Off Funks			32,530						32,530
Grand Bank		885	273,825		378			2,500	287,485
Green Bank		40	65,439		135				71,915
St. Peters Bank		2,975	214,734						221,499
Bay of Islands							3,555,314		3,555,314
Off Newfoundland			81,573						81,573
Total		3,900	668,101		513		3,555,314	2,500	4,250,316
Off Canada:									
Seal Island grounds	672	6,075	164					1,850	36,416
Gulf of St. Lawrence			44,526	2,800	1,901				987,917
Scatari Bank		1,102	6,117						17,089
Gurdo Bank					4,474				4,474
Quereau Bank	247	15,360	215,794		2,119			2,451	329,818
The Gully	355	10,125	48,671		5,567				126,303
Sable Island Bank (Western Bank)	388,880	14,210	82,706	185,240	195			193,954	12,315,458
Cape Shore	90,870	387,645	11,578	16,675	32,367	189,784		58,245	5,168,034
Emerald Bank	275	940	822						83,817
La Have Bank	223,905	162,625	136,300	180,505	1,421	420		117,888	9,200,978
Roseway Bank	2,100	18,555	976					2,375	314,066
Total	707,304	616,637	547,654	385,220	48,044	190,204		376,763	28,584,370
West of 66° W. longitude									
Off United States:									
Browns Bank	603,335	2,000,857	374,988	239,945	533,003			453,537	39,752,465
Georges Bank	2,643,626	522,136	829,482	5,413,209	1,132,365	1,505,212	5,700	863,519	100,142,605
Clark Bank	2,300			585					23,035
South Channel	1,037,042	238,410	83,038	1,719,505	615	1,172,913		361,596	38,935,329
Off Highland Light	560	600		815				120	73,220
Off Chatham	58,460	3,050	537	55,875	392	1,037,980		28,920	1,959,067
Nantucket Shoals	59,410	1,760	49,186	608,725	3,379	785,022		48,501	5,359,248
Cashes Bank	26,015	225,200	3,707					16,265	708,645
Fippenies Bank	4,230	18,670	522					950	106,822
Platts Bank	3,680	7,430	388					4,325	66,820
Jeffreys Ledge	180,876	300,883	3,104	35,243		4,920		126,042	2,547,423
Tillies Bank	500	200							7,390
Middle Bank (Stellwagen Bank)	13,040	64,520	806	10,230		69,775		6,672	902,896
South				400		2,249,050		3,165	2,252,615
Shore, general	2,292,369	264,858	8,968	1,805,592	42,018	22,531,363	747,130	954,765	40,365,592
Total	6,925,443	3,648,574	1,354,726	9,890,124	1,711,772	29,356,235	752,830	2,868,377	233,203,172
Grand total	7,632,747	4,269,111	2,570,481	10,275,344	1,760,329	29,546,439	4,308,144	3,247,640	266,037,858

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[1] Exclusive of duplication.

NOTE.—The weight of salted fish landed has been converted to the equivalent of fresh fish as landed.

Days' absence from port of fishing vessels landing fish at Boston and Gloucester, Mass., and Portland, Me., 1931

Fishing ground	January	February	March	April	May	June	July
Off Newfoundland:							
Grand Bank				2	91		47
Green Bank		27					
St. Peters Bank		21	44	27			21
Bay of Islands	316						
Off Newfoundland							36
Total	316	48	44	29	91		104
Off Canada:							
Gulf of St. Lawrence					22		
Scatari Bank						35	
Quereau Bank				5	45	141	
The Gully			24	55			
Sable Island Bank (Western Bank)	240		98	347	97	62	93
Cape Shore	39				16	54	23
Emerald Bank							8
La Have Bank	198	146	40	101	52	32	70
Roseway Bank					8		
Total	477	146	162	508	240	324	194
Off United States:							
Browns Bank	718	899	978	1,212	341	122	614
Georges Bank	1,644	1,276	1,982	1,028	1,446	2,047	2,430
Clark Bank	8						
South Channel	488	240	366	136	435	740	1,114
Off Chatham	15	20	28	10	19	24	405
Nantucket Shoals	80	41	60	35	127	54	194
Cashes Bank	24		10	14	19		5
Fippenies Bank				5			
Platts Bank	5	2					
Jeffreys Ledge	190	141	91	16	14	7	1
Middle Bank (Stellwagen Bank)	50	49	37	4			6
South				9	274	79	
Shore, general	684	595	741	912	756	1,059	605
Total	3,906	3,263	4,293	3,381	3,431	4,132	5,374
Grand total	4,699	3,457	4,499	3,918	3,762	4,456	5,672

Fishing ground	August	September	October	November	December	Total
Off Newfoundland:						
Off Funks	5					5
Grand Bank	43					183
Green Bank	43					70
St. Peters Bank						113
Bay of Islands					96	412
Off Newfoundland						36
Total	91				96	819
Off Canada:						
Seal Island grounds			11			90
Gulf of St. Lawrence	48		5	15		11
Scatari Bank						35
Gurdo Bank		26				26
Quereau Bank	22	63	32			308
The Gully	20					99
Sable Island Bank (Western Bank)		32	71	129	117	1,286
Cape Shore	70	93	95	470	361	1,221
Emerald Bank						8
La Have Bank	87	87	183	170	210	1,376
Roseway Bank	5				28	41
Total	252	301	397	784	716	4,501
Off United States:						
Browns Bank	934	259	117	160	421	6,775
Georges Bank	1,719	2,592	1,353	1,591	1,360	20,468
Clark Bank						8
South Channel	1,061	711	1,048	446	194	6,979
Off Highland Light		3	7	4		14
Off Chatham	46		36	15	13	631
Nantucket Shoals	73	96	150	173	96	1,179
Cashes Bank			5	42	11	130

Days' absence from port of fishing vessels landing fish at Boston and Gloucester, Mass., and Portland, Me., 1931—Continued

Fishing ground	August	September	October	November	December	Total
Off United States—Continued.						
Fippenies Bank			5	9	9	28
Platts Bank			5	3		15
Jeffreys Ledge	2	11	91	83	88	735
Tillies Bank					8	8
Middle Bank (Stellwagen Bank)			14	58	79	297
South						362
Shore, general	1, 768	1, 729	1, 021	1, 343	770	11, 983
Total	5, 603	5, 401	3, 852	3, 927	3, 049	49, 612
Grand total	5, 946	5, 702	4, 249	4, 711	3, 861	54, 932

MACKEREL FISHERY OF THE ATLANTIC COAST

That part of the 1931 mackerel catch taken by purse seines and drift gill nets and landed at the principal Atlantic receiving ports amounted to 36,483,472 pounds, a decrease of 16 per cent as compared with similar figures for the previous year. Because of their importance in certain seasons, the catch of fishing boats of less than 5 net tons capacity has been included in so far as data were available. The catch by shore gear, such as pound nets and traps, were omitted. Practically all of the statistics were collected by the bureau's agents at Cape May, N. J.; New York City, N. Y.; Boston, Gloucester, and Woods Hole, Mass.; and Portland, Me. A few of the landings, particularly at ports not having a bureau representative, were secured from unofficial sources and often consisted of estimated rather than "weighed out" fares. The error involved is probably well under 5 per cent in the vessel fishery. The figures on the boat fishery are probably less complete.

Mackerel fishery of the Atlantic coast, 1931

CATCH: BY PORTS IN 5-DAY PERIODS [1]

Date	Cape May, Wildwood, and Atlantic City	New York	Newport, New Bedford, Cape Cod Canal, Woods Hole, Nantucket, and Provincetown	Boston	Gloucester	Portland, Rockland, Boothbay, and Southwest Harbor	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
April 6–10	14, 500						14, 500
April 11–15	1, 900						1, 900
April 16–20	942, 222	86, 700					1, 028, 922
April 21–25	608, 378	13, 970					622, 348
April 26–30	145, 500	5, 458		57, 300			208, 258
May 1–5	559, 233	182, 475	1, 800	31, 380			774, 888
May 6–10	475, 450	107, 136	350				582, 936
May 11–15	104, 250	654, 825	66, 103	548, 300			1, 373, 478
May 16–20		167, 850	200, 540	271, 500	1, 175		641, 065
May 21–25		154, 239	193, 555	384, 685	24, 450	655	757, 584
May 26–31		89, 530	376, 251	684, 375	215, 720	12, 270	1, 378, 146
June 1–5		90, 000	117, 663	662, 380	51, 485	13, 870	935, 398
June 6–10		38, 000	50, 075	426, 840	95, 519	1, 165	611, 599

[1] The landings at the ports of Boston, Gloucester, and Portland vary somewhat from those published under "Vessel fisheries at principal New England ports" in the annual reports of the division of fishery industries, due to the inclusion of landings of some small boats in the above data and also to different methods in the collection of the statistics.

Mackerel fishery of the Atlantic coast, 1931—Continued

CATCH: BY PORTS IN 5-DAY PERIODS—Continued.

Date	Cape May, Wildwood, and Atlantic City	New York	Newport, New Bedford, Cape Cod Canal, Woods Hole, Nantucket, and Provincetown	Boston	Gloucester	Portland, Rockland, Boothbay, and Southwest Harbor	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
June 11-15			40, 415	174, 930	9, 435	3, 601	228, 381
June 16-20		20, 000	68, 590	1, 067, 891	97, 095	15, 282	1, 268, 858
June 21-25		11, 000	268, 000	609, 270	28, 370	37, 962	954, 602
June 26-30			5, 600	539, 025	76, 455	12, 225	633, 305
July 1-5				1, 068, 645	196, 370	42, 596	1, 307, 611
July 6-10			21, 500	1, 126, 930	152, 050	8, 085	1, 308, 565
July 11-15			89, 625	642, 720	66, 720	5, 935	805, 000
July 16-20				729, 262	187, 655	1, 770	918, 687
July 21-25			31, 000	325, 800	50, 380	730	407, 910
July 26-31			4, 275	420, 225	72, 550	29, 180	526, 230
Aug. 1-5				923, 131	235, 875	190, 840	1, 349, 846
Aug. 6-10			13, 000	426, 275	274, 715	189, 855	903, 845
Aug. 11-15				393, 005	49, 350	104, 076	546, 431
Aug. 16-20				1, 406, 915	562, 172	248, 175	2, 217, 262
Aug. 21-25				1, 444, 310	1, 171, 383	281, 388	2, 897, 081
Aug. 26-31			60, 000	943, 440	771, 000	401, 862	2, 176, 302
Sept. 1-5				629, 070	222, 355	96, 185	947, 610
Sept. 6-10				592, 985	401, 080	77, 850	1, 071, 915
Sept. 11-15				899, 025	626, 902	238, 795	1, 764, 722
Sept. 16-20			15, 000	445, 430	207, 470	161, 723	829, 623
Sept. 21-25				499, 930	633, 655	227, 487	1, 361, 072
Sept. 26-30				327, 600	213, 160	12, 820	553, 580
Oct. 1-5			4, 500	284, 830	167, 305	1, 843	458, 478
Oct. 6-10			1, 535	273, 830	26, 466	4, 355	306, 186
Oct. 11-15			3, 633	52, 530	88, 543	5, 035	149, 741
Oct. 16-20				59, 645	2, 445	277	62, 367
Oct. 21-25				184, 747	68, 040	342	253, 129
Oct. 26-31					4, 815	779	5, 594
Nov. 1-5				1, 390	4, 340	773	6, 503
Nov. 6-10					12, 496	489	12, 985
Nov. 11-15					31, 741	750	32, 491
Nov. 16-20				49, 925	58, 020	475	108, 420
Nov. 21-25				106, 017	565, 575	9, 360	680, 952
Nov. 26-30				45, 630	217, 922		263, 552
Dec. 1-5				46, 868	65, 548		112, 416
Dec. 6-10				24, 420	74, 522		98, 942
Dec. 11-15				1, 300	18, 116		19, 416
Dec. 16-20				2, 100	740		2, 840
Total	2, 851, 433	1, 621, 183	1, 633, 010	19, 835, 806	8, 101, 180	2, 440, 860	36, 483, 472

OPERATING UNITS AND CATCH: BY FLEET CLASSIFICATION AND GROUNDS

Designation	Vessels and boats	Tonnage	Crew	Trips	Total catch
SOUTHERN					
Seiners:	*Number*	*Net tons*	*Number*	*Number*	*Pounds*
Regular vessels	36	1, 386	460	212	3, 742, 709
Miscellaneous vessels	19	710	218	47	721, 189
Netters:					
Regular vessels	19	409	135	121	594, 841
Miscellaneous vessels	17	283	107	49	181, 335
Miscellaneous boats	2			4	4, 165
Total	[1] 91	2, 788	920	433	5, 244, 239

[1] Exclusive of boats and of duplication.

Mackerel fishery of the Atlantic coast, 1931—Continued

OPERATING UNITS AND CATCH: BY FLEET CLASSIFICATION AND GROUNDS—Continued

Designation	Vessels and boats	Tonnage	Crew	Trips	Total catch
BLOCK ISLAND	*Number*	*Net tons*	*Number*	*Number*	*Pounds*
Seiners:					
Regular vessels (spring)	47	1, 645	587	261	4, 300, 955
Miscellaneous vessels (spring)	32	798	259	63	932, 478
Miscellaneous vessels (summer)	24	930	297	34	886. 547
Netters:					
Regular vessels	16	262	99	63	555, 127
Miscellaneous vessels	25	461	157	36	332, 866
Miscellaneous boats	8	----------	----------	18	55, 209
Total	[1] 121	4, 096	1, 399	475	7, 063. 182
GULF OF MAINE					
Seiners:					
Regular vessels	55	1, 883	673	918	17, 288, 071
Miscellaneous vessels	54	1, 236	457	398	5, 013, 146
Miscellaneous boats	7	----------	----------	23	151, 450
Netters:					
Spring—					
Regular vessels	2	18	9	28	39, 844
Miscellaneous vessels	9	119	45	13	22, 930
Miscellaneous boats	6	----------	----------	17	13, 800
Fall—					
Regular vessels	46	1, 140	348	596	1, 110, 824
Miscellaneous vessels	31	645	217	124	235, 004
Miscellaneous boats	11	----------	----------	26	13, 658
Total	[1] 147	5, 041	1, 749	2, 143	23, 888, 727
CAPE SHORE					
Seiners, regular vessels	5	262	70	6	287, 324
Total seiners	[1] 112	----------	----------	1, 962	33, 323, 869
Total netters	[1] 94	----------	----------	1, 095	3, 159, 603
Grand total	[1] 160	----------	----------	3, 057	36, 483, 472

[1] Exclusive of boats and of duplication.

FISHERIES OF THE MIDDLE ATLANTIC STATES[6]

The yield of fishery products in the Middle Atlantic States (New York, New Jersey, Pennsylvania, and Delaware) during 1930 amounted to 193,867,981 pounds, valued at $13,063,672. This is an increase of 2 per cent in the amount of the catch, but a decrease of 8 per cent in the value of the catch as compared with the quantity and its value for 1929. Of the total catch in 1930, 131,637,591 pounds, valued at $3,587,793, were fish; and 62,230,390 pounds, valued at $9,475,879, were shellfish and miscellaneous products. These fisheries gave employment to 10,065 fishermen or 1 per cent more than in 1929. Of the total number of fishermen employed during 1930, 4,665 regular fishermen were engaged on vessels, and 3,180 regular and 2,760 casual fishermen were employed in the shore and boat fisheries.

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[6] With reference to the figures published in this section the reader should refer to that section in the latter part of the book entitled "Statistical Survey Procedure" which gives in detail methods for collecting statistics, compilation practices, and conversion factors. This is most necessary for a complete understanding of the statistics presented herewith.

Fisheries of the Middle Atlantic States, 1930

SUMMARY OF CATCH

Product	New York		New Jersey		Pennsylvania	
	Pounds	Value	Pounds	Value	Pounds	Value
Fish	27,280,562	$1,067,939	55,578,024	$1,993,577	16,745	$2,803
Shellfish, etc	18,213,989	3,865,710	41,697,861	5,480,848	----------	----------
Total	45,494,551	4,933,649	97,275,885	7,474,425	16,745	2,803

Product	Delaware		Total	
	Pounds	Value	Pounds	Value
Fish	48,762,260	$523,474	131,637,591	$3,587,793
Shellfish, etc	2,318,540	129,321	62,230,390	9,475,879
Total	51,080,800	652,795	193,867,981	13,063,672

OPERATING UNITS: BY STATES

Item	New York	New Jersey	Pennsylvania	Delaware	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	707	3,292	----------	666	4,665
On boats and shore—					
Regular	1,236	1,747	----------	197	3,180
Casual	1,157	1,177	52	374	2,760
Total	3,100	6,216	52	1,237	10,605
Vessels:					
Steam	1	----------	----------	14	15
Net tonnage	36	----------	----------	1,904	1,940
Motor	168	286	----------	9	463
Net tonnage	2,275	4,434	----------	289	6,998
Sail	10	77	----------	10	97
Net tonnage	88	2,085	----------	133	2,306
Total vessels	179	363	----------	33	575
Total net tonnage	2,399	6,519	----------	2,326	11,244
Boats:					
Motor	562	1,379	5	68	2,014
Other	1,080	750	14	192	2,036
Accessory boats	79	121	----------	86	286
Apparatus:					
Purse seines—					
Menhaden	4	1	----------	16	21
Length, yards	1,340	456	----------	6,528	8,324
Other	1	15	----------	----------	16
Length, yards	400	5,880	----------	----------	6,280
Haul seines	141	102	11	87	341
Length, yards	20,503	11,898	1,380	23,970	57,751
Gill nets—					
Anchor	198	5	----------	----------	203
Square yards	34,387	5,940	----------	----------	40,327
Drift	581	862	11	79	1,533
Square yards	450,986	658,830	15,690	211,379	1,336,885
Runaround	40	90	----------	45	175
Square yards	71,620	405,674	----------	40,000	517,294
Stake	110	1,340	----------	209	1,659
Square yards	35,819	161,823	----------	23,424	221,066
Lines—					
Hand	90	555	1	52	698
Hooks	128	793	1	104	1,026
Trawl	1,897	824	----------	14	2,735
Hooks	279,225	503,450	----------	6,100	788,775
Troll	20	304	----------	----------	324
Hooks	20	316	----------	----------	336
Trot, with baits or snoods	----------	4	----------	1	5
Baits or snoods	----------	1,775	----------	50	1,825
Trot, with hooks	15	----------	----------	----------	15
Hooks	2,640	----------	----------	----------	2,640

Fisheries of the Middle Atlantic States, 1930—Continued

OPERATING UNITS: BY STATES—Continued

Item	New York	New Jersey	Pennsylvania	Delaware	Total
	Number	*Number*	*Number*	*Number*	*Number*
Apparatus—Continued					
Pound nets	418	181	-----	67	666
Floating traps	9	-----	-----	-----	9
Wiers	-----	83	-----	-----	83
Stop nets	18	60	-----	9	87
Square yards	13,170	34,704	-----	3,368	51,242
Fyke nets	2,412	1,772	30	320	4,534
Dip nets	65	36	-----	36	137
Cast nets	-----	4	-----	7	11
Scap nets	158	-----	-----	-----	158
Drag nets	18	6	-----	-----	24
Yards at mouth	32	17	-----	-----	49
Push nets	29	-----	-----	-----	29
Otter trawls—					
Fish	114	61	-----	-----	175
Yards at mouth	2,887	1,331	-----	-----	4,218
Scallops	1	-----	-----	-----	1
Yards at mouth	12	-----	-----	-----	12
Shrimp	1	3	-----	-----	4
Yards at mouth	30	72	-----	-----	102
Pots—					
Crab	54	4	-----	-----	58
Eel	4,391	5,299	-----	775	10,465
Lobster	17,841	33,920	-----	185	51,946
Harpoons	21	-----	-----	-----	21
Spears	139	60	-----	6	205
Dredges—					
Clam	16	56	-----	10	82
Yards at mouth	16	62	-----	10	88
Crab	-----	53	-----	-----	53
Yards at mouth	-----	59	-----	-----	59
Mussel	8	-----	-----	-----	8
Yards at mouth	10	-----	-----	-----	10
Oyster	105	537	-----	32	674
Yards at mouth	144	634	-----	39	817
Scallop	1,210	9	-----	-----	1,219
Yards at mouth	1,196	29	-----	-----	1,225
Tongs	605	868	-----	80	1,553
Rakes	455	667	-----	6	1,128
Forks	456	19	-----	-----	475
Hoes	-----	74	-----	-----	74
Gaffs	-----	32	-----	1	33

Fisheries of the Middle Atlantic States, 1930—Continued

CATCH: BY STATES

Species	New York		New Jersey		Pennsylvania		Delaware		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH										
Albacore	59, 900	$2, 050	31, 114	$509					91, 014	$2, 559
Alewives	631, 694	10, 053	1, 464, 122	15, 928	2, 000	$100	3, 193, 966	$9, 742	5, 291, 782	35, 823
Bluefish	821, 080	77, 657	2, 961, 744	312, 662			31, 010	2, 314	3, 813, 834	392, 633
Bonito	186, 589	13, 733	230, 246	13, 161					416, 835	26, 894
Butterfish	742, 791	58, 445	2, 393. 821	178, 609					3, 136, 612	237, 054
Carp	170, 450	22, 871	100, 432	13, 146	893	97	85, 836	9, 045	357, 611	45, 159
Catfish and bullheads	17, 538	3, 071	36, 347	2, 961	1, 425	163	38, 917	3, 761	94. 227	9, 956
Cero			20, 000	2, 000					20, 000	2, 000
Cod	2, 802, 306	95, 220	7, 779, 371	235, 669			97, 144	3, 600	10, 678, 821	334, 489
Croaker	325, 000	8, 125	1, 439, 807	50, 493			1, 124, 930	28, 704	2, 889, 737	87, 322
Cusk			8, 400	84					8, 400	84
Dolphin			1, 132	40					1, 132	40
Drum:										
Black			6, 904	135					6, 904	135
Red or redfish			64, 924	11, 656					64, 924	11, 656
Eels	637, 477	77, 378	539, 749	58, 608	865	200	93, 589	10, 996	1, 271, 680	147, 182
Flounders	6, 499, 904	216, 314	2, 926, 352	147, 850			132, 553	9, 503	9, 558, 809	373, 667
Gizzard shad							950	7	950	7
Goosefish			37, 892	1, 118					37, 892	1, 118
Grayfish	1, 250	38	11, 440	229					12, 690	267
Grunts			150	6					150	6
Haddock	2, 567, 655	76, 837	5, 797	205					2, 573, 452	77, 042
Hagfish			7, 200	72					7, 200	72
Hake	142, 755	2, 446	222, 747	4, 002					365, 502	6, 448
Halibut	4, 895	968							4, 895	968
Herring, sea	32, 456	674	659, 847	6, 664					692, 303	7, 338
King whiting or "kingfish"	14, 021	1, 821	69, 223	7, 538			3, 080	119	86, 324	9, 478
Mackerel	464, 735	20, 743	655, 728	25, 442					1, 120, 463	46, 185
Menhaden	4, 599, 640	19, 423	5, 918, 010	41, 350			41, 960, 142	307, 112	52, 477, 792	367, 885
Minnows	147, 694	4, 438	18, 000	220					165, 694	4, 658
Mullet			340	22			64, 800	4, 300	65, 140	4, 322
Mummichog	110, 155	9, 167	16, 000	200					126, 155	9, 367
Pike or pickerel	705	108							705	108
Pilotfish			2, 460	123					2, 460	123
Pollock	111, 430	2, 787	2, 964	111					114, 394	2, 898
Rosefish	1, 375	41							1, 375	41
Scup or porgy	1, 089, 581	31, 257	7, 564, 041	183, 266			27, 000	2, 160	8, 680, 622	216, 683
Sea bass	319, 751	24, 468	3, 546, 149	134, 360			20, 250	1, 620	3, 886, 150	160, 448

Sea robin	14,654	315	117,747	1,946					132,401	2,261
Shad	167,162	28,267	223,714	41,127	4,855	1,464	54,446	10,874	450,177	81,732
Sharks	450	23	176,469	3,795					176,919	3,818
Silversides	260,410	12,395							260,410	12,395
Skates	27,513	333	241,091	4,380					268,604	4,713
Smelt	3,100	868							3,100	868
Snapper, red			4,000	400					4,000	400
Spanish mackerel			15,839	1,496					15,839	1,496
Spot	3,878	309	542,616	22,645			146,761	8,250	693,255	31,204
Squeteague or "sea trout," gray	939,368	67,165	11,097,692	357,844			1,234,725	40,468	13,271,785	465,477
Striped bass	66,440	11,344	36,862	5,761			102,027	22,449	205,329	39,554
Sturgeon	2,110	610	4,208	1,787	182	182	15,313	6,253	21,813	8,832
Suckers	44,352	5,054	27,575	2,827	6,525	597	150	9	78,602	8,487
Sunfish	2,028	211							2,028	211
Swordfish	234,140	37,887							234,140	37,887
Tautog	82,177	6,196	181,966	6,115			74,000	2,300	338,143	14,611
Thimble-eyed mackerel			35,722	1,115					35,722	1,115
Tilefish	2,312,200	88,415							2,312,200	88,415
Tomcod	120,805	4,818							120,805	4,818
Tuna or "horse mackerel"	19,600	2,301	37,562	2,473					57,162	4,774
Whitebait	95,800	7,140							95,800	7,140
White perch	20,791	3,070	149,356	17,226			209,971	35,115	380,118	55,411
Whiting	349,267	10,367	3,763,942	59,568					4,113,209	69,935
Wolffish	6,425	113							6,425	113
Yellow perch	5,065	605	179,210	14,633			47,760	4,689	232,035	19,927
Yellowtail							2,940	84	2,940	84
Total	27,280,562	1,067,939	55,578,024	1,993,577	16,745	2,803	48,762,260	523,474	131,637,591	3,587,793
SHELLFISH, ETC.										
Crabs:										
Hard	165,144	8,716	252,056	20,307					417,200	29,023
King			5,215,800	27,548			968,760	1,265	6,184,560	28,813
Rock	640	80							640	80
Soft	5,576	1,704	105,824	15,173			23,800	4,850	135,200	21,727
Lobsters	536,391	136,692	1,010,579	230,110			11,750	2,620	1,558,720	369,422
Shrimp	95,530	14,318	245,526	14,485					341,056	28,803
Squid	533,984	21,757	1,239,524	33,019					1,773,508	54,776
Clams:										
Hard, public [1]	793,656	358,302	1,561,556	648,098			18,503	3,790	2,373,715	1,010,190
Hard, private [1]	46,180	18,122	150,910	25,058			6,003	2,001	203,093	45,181
Razor	3,080	756							3,080	756
Soft, public [2]	501,975	70,448	628,628	87,808					1,130,603	158,256
Soft, private [2]	192	12							192	12
Surf or skimmers	291,270	34,639	131,670	15,281					422,940	49,920

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[1] Statistics on hard clams used in this table are based on yields of 9 pounds of meats per bushel for those from public beds in New York, and 8 pounds for those from public beds in New Jersey and Delaware; 10 pounds for those from private beds in New York and New Jersey, and 8 pounds for those from private beds in Delaware. In reports for previous years all hard clams in these States have been computed on the basis of a uniform yield of 8 pounds of meats to the bushel.

[2] Statistics on soft clams used in this table are based on yields of 15 pounds of meats to the bushel in New York and 12 pounds in New Jersey. In reports for previous years all soft clams have been computed on the basis of a uniform yield of 10 pounds of meats to the bushel.

Fisheries of the Middle Atlantic States, 1930—Continued

CATCH: BY STATES—Continued

Species	New York		New Jersey		Pennsylvania		Delaware		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
SHELLFISH, ETC.—continued										
Conchs	35, 226	$2, 945							35, 226	$2, 945
Mussels	271, 500	11, 985	4, 200	$282			19, 500	$1, 875	295, 200	14, 142
Oysters: [3]										
Market, public, spring	8, 767	2, 166	37, 602	5, 671					46, 369	7, 837
Market, public, fall	7, 521	1, 858	121, 226	16, 613			166, 467	18, 942	295, 214	37, 413
Market, private, spring	4, 741, 779	1, 123, 278	3, 656, 171	587, 952			28, 120	3, 967	8, 426, 070	1, 715, 197
Market, private, fall	4, 505, 158	1, 045, 663	8, 009, 996	1, 238, 752			233, 513	32, 002	12, 748, 667	2, 316, 417
Seed, public, spring	132, 720	17, 475	18, 621, 970	2, 421, 382			764, 100	53, 370	19, 518, 790	2, 492, 227
Seed, public, fall	96, 215	13, 460	82, 804	9, 959			75, 374	4, 501	254, 393	27, 920
Seed, private, spring	738, 878	130, 006	439, 343	42, 044					1, 178, 221	172, 050
Seed, private, fall	2, 854, 610	381, 550	4, 000	300					2, 858, 610	381, 850
Scallops:										
Bay	396, 711	115, 274							396, 711	115, 274
Sea	1, 338, 462	230, 746	164, 100	33, 342					1, 502, 562	264, 088
Terrapin, diamond-back			6, 041	7, 052					6, 041	7, 052
Turtles:										
Loggerhead			905	31					905	31
Snapper			7, 430	581			2, 650	138	10, 080	719
Bloodworms	54, 404	62, 588							54, 404	62, 588
Sandworms	58, 420	61, 170							58, 420	61, 170
Total	18, 213, 989	3, 865, 710	41, 697, 861	5, 480, 848			2, 318, 540	129, 321	62, 230, 390	9, 475, 879
Grand total	45, 494, 551	4, 933, 649	97, 275, 885	7, 474, 425	16, 745	$2, 803	51, 080, 800	652, 795	193, 867, 981	13, 063, 672

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[3] Statistics on oysters used in this table are based on yields of 7 pounds of meats per bushel for market oysters in New York, 8.41 pounds for market oysters in New Jersey, and 7.5 pounds for market oysters in Delaware; and 7 pounds for seed oysters in New York, and 4.5 pounds for seed oysters in New Jersey and Delaware. In reports for previous years, all oysters in these States have been computed on the basis of a uniform yield of 7 pounds of meats to the bushel.

NOTE.—Of the above catch, all the cero and red snapper were taken off the coast of Florida. In addition, 45,000 pounds of shrimp, valued at $1,800, which were reported under New York, were taken off the coast of Florida; and 830 pounds of bluefish, valued at $123; 6,750 pounds of shad, valued at $900; 2,141 pounds of Spanish mackerel, valued at $145; and 222,658 pounds of shrimp, valued at $9,132 which were reported under New Jersey, were also taken off the coast of Florida.

Fisheries of the Middle Atlantic States, 1930—Continued

PRODUCTION OF CERTAIN SHELLFISH IN NUMBERS AND BUSHELS

Product	New York		New Jersey		Delaware		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Crabs:								
Hard……number	495,432	$8,716	756,168	$20,307			1,251,600	$29,023
King……do			1,303,950	27,548	242,190	$1,265	1,546,140	28,813
Rock……do	1,920	80					1,920	80
Soft……do	16,728	1,704	317,472	15,173	71,400	4,850	405,600	21,727
Clams:								
Hard, public……bushels	88,184	358,302	195,194	648,098	2,313	3,790	285,691	1,010,190
Hard, private……do	4,618	18,122	15,091	25,058	750	2,001	20,459	45,181
Soft, public……do	33,465	70,448	52,386	87,808			85,851	158,256
Soft, private……do	13	12					13	12
Surf or skimmers……do	24,272	34,639	10,972	15,281			35,244	49,920
Conchs……do	1,957	2,945					1,957	2,945
Mussels……do	27,150	11,985	420	282	1,950	1,875	29,520	14,142
Oysters:								
Market, public, spring……bushels	1,252	2,166	4,471	5,671			5,723	7,837
Market, public, fall……do	1,074	1,858	14,415	16,613	22,196	18,942	37,685	37,413
Market, private, spring……bushels	677,397	1,123,278	434,741	587,952	3,749	3,967	1,115,887	1,715,197
Market, private, fall……do	643,594	1,045,663	952,437	1,238,752	31,135	32,002	1,627,166	2,316,417
Seed, public, spring……do	18,960	17,475	4,138,216	2,421,382	169,800	53,370	4,326,976	2,492,227
Seed, public, fall……do	13,745	13,460	18,401	9,959	16,750	4,501	48,896	27,920
Seed, private, spring……do	105,554	130,006	97,632	42,044			203,186	172,050
Seed, private, fall……do	407,801	381,550	889	300			408,690	381,850
Scallops:								
Bay……do	66,118	115,274					66,118	115,274
Sea……do	223,077	230,746	27,350	33,342			250,427	264,088

Industries related to the fisheries of the Middle Atlantic States, 1930

Item	New York	New Jersey	Pennsylvania	Delaware	Total
Transporting:					
Persons engaged—	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	61	35		5	101
On boats		117			117
Total	61	152		5	218
Vessels—					
Motor	24	10		1	35
Net tonnage	357	159		9	525
Boats		176			176
Wholesale and manufacturing:					
Establishments	246	124	56	18	444
Persons engaged—					
Proprietors	257	165	86	23	531
Salaried employees	677	141	124	22	964
Wage earners:					
Average for season	1,845	1,536	540	330	4,254
Average for year	1,686	929	453	130	3,198
Salaries and wages paid	$5,420,042	$1,242,574	$1,163,278	$130,186	$7,956,080
Products [1]	$8,987,601	$3,649,260	$2,027,205	$757,259	$15,421,325
Fishermen's manufactured products:					
Persons engaged	504	49		39	592
Products	$412,162	$40,847		$7,104	$460,113

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[1] These production figures are not comparable with those shown in previous bulletins since packaged fresh and frozen fishery products are now included.

NOTE.—Of the total number of persons employed on transporting craft, 124 have also been included as fishermen, and among the total persons engaged in the preparation of fishermen's manufactured products, 545 have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

NEW YORK

Fisheries of New York, 1930

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets			
	Menhaden	Other		Anchor	Drift	Run-around	Stake
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	67	12		2	37	16	
On boats and shore—							
Regular			151	36	18	45	40
Casual			186	33	203	6	71
Total	67	12	337	71	258	67	111
Vessels:							
Motor—							
5 to 10 tons				1		5	
11 to 20 tons	3				1	1	
21 to 30 tons	1	1			1		
41 to 50 tons					1		
61 to 70 tons					1		
Total	4	1		1	4	6	
Net tonnage	67	29		7	142	51	
Boats:							
Motor			16	15	20	25	11
Other			133	18	97	10	83
Accessory boats	7	2			16	1	
Apparatus:							
Number	4	1	141	198	581	40	110
Length, yards	1,340	400	20,503				
Square yards				34,387	450,986	71,620	35,819

Item	Lines				Pound nets	Floating traps	Stop nets
	Hand	Trawl	Trot, with hooks	Troll			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	20	91			6		
On boats and shore—							
Regular	37	134	2	7	142	10	7
Casual	16	7	16	2	12		27
Total	73	232	18	9	160	10	34
Vessels:							
Motor—							
5 to 10 tons	4	12			3		
11 to 20 tons		4					
21 to 30 tons	1	1					
41 to 50 tons		1					
51 to 60 tons		1					
Total	5	19			3		
Net tonnage	53	264			18		
Boats:							
Motor	41	55		5	49	2	3
Other	12	9	15		120	5	19
Accessory boats		50					
Apparatus:							
Number	90	1,897	15	20	418	9	18
Square yards							13,170
Hooks, baits, or snoods	128	279,225	2,640	20			

Fisheries of New York, 1930—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Fyke nets	Dip nets	Scap nets	Drag nets	Push nets	Otter trawls		
						Fish	Scallop	Shrimp
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	9			2		154	3	4
On boats and shore—								
Regular	87	52	4	16	25	97		
Casual	74	13	154	2	4	14		
Total	170	65	158	20	29	265	3	4
Vessels:								
Motor—								
5 to 10 tons	5			1		35		
11 to 20 tons						10	1	1
21 to 30 tons						3		
61 to 70 tons						1		
Total	5			1		49	1	1
Net tonnage	35			10		555	13	12
Sail—21 to 30 tons						1		
Net tonnage						27		
Total vessels	5			1		50	1	1
Total net tonnage	35			10		582	13	12
Boats:								
Motor	32	4		2		64		
Other	103	52	96	12	24	2		
Accessory boats	2							
Apparatus:								
Number	2,412	65	158	18	29	114	1	1
Yards at mouth				32		2,887	12	30

Item	Pots			Harpoons	Spears	Dredges	
	Crab	Eel	Lobster			Clam	Mussel
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:							
On vessels		4	9	33		14	18
On boats and shore—							
Regular	4	109	167	26	82	9	
Casual	2	34	22		57	3	
Total	6	147	198	59	139	26	18
Vessels:							
Motor—							
5 to 10 tons		2	6	4		6	
11 to 20 tons						1	3
21 to 30 tons				1			1
61 to 70 tons				1			
Total		2	6	6		7	4
Net tonnage		16	42	115		55	64
Sail—21 to 30 tons				1			
Net tonnage				27			
Total vessels		2	6	7		7	4
Total net tonnage		16	42	142		55	64
Boats:							
Motor	2	46	126	13	2	8	
Other	2	82	2	12	121		
Accessory boats				6			
Apparatus:							
Number	54	4,391	17,841	21	139	16	8
Yards at mouth						16	10

Fisheries of New York, 1930—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Dredges—Contd.		Tongs	Rakes	Forks	By hand	Total, exclusive of duplication
	Oyster	Scallop					
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	221	152	57	2			707
On boats and shore—							
Regular	8	203	445	311	283	83	1, 236
Casual	2	152	112	141	176	37	1, 157
Total	231	507	614	454	459	120	3, 100
Vessels:							
Steam—31 to 40 tons	1						1
Net tonnage	36						36
Motor—							
5 to 10 tons	14	19	26	1			94
11 to 20 tons	17	13					44
21 to 30 tons	12	3					21
31 to 40 tons	2						2
41 to 50 tons	2						4
51 to 60 tons	1						2
61 to 70 tons							1
Total	48	35	26	1			168
Net tonnage	882	407	164	6			2, 275
Sail—							
5 to 10 tons		7	1				8
11 to 20 tons		1					1
21 to 30 tons							1
Total		8	1				10
Net tonnage		55	6				88
Total vessels	49	43	27	1			179
Total net tonnage	918	462	170	6			2, 399
Boats:							
Motor	4	30	182	155			562
Other		158	306	270	39	1	1, 080
Accessory boats							79
Apparatus:							
Number	105	1, 210	605	455	456		
Yards at mouth	144	1, 196					

CATCH: BY GEAR

Species	Purse seines				Haul seines		Gill nets—Anchor	
	Menhaden		Other					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					470, 336	$6, 279		
Bluefish					6, 030	1, 054	41, 572	$6, 217
Carp					69, 168	9, 649	400	56
Catfish and bullheads					2, 286	440	20	3
Cod					3, 850	105		
Eels					107, 430	2, 985		
Flounders					5, 300	530		
Menhaden	4, 475, 640	$18, 183						
Minnows					147, 494	4, 368		
Mummichog					86, 620	6, 922		
Pike or pickerel					400	54		
Scup or porgy			500, 000	$7, 500				
Sea robin							400	10
Shad					1, 148	223		
Silversides					260, 370	12, 391		
Smelt					2, 500	750	50	20
Squeteagues or "sea trout," gray			200, 000	5, 000	33, 350	5, 283	84, 247	11, 563
Striped bass					41, 380	8, 548	2, 011	497
Sturgeon					75	15	599	135
Suckers					10, 087	1, 017	875	90
Sunfish					661	72		
Whitebait					95, 800	7, 140		
White perch					3, 170	664	2, 849	282
Yellow perch					250	35		
Shrimp					400	60		
Total	4, 475, 640	18, 183	700, 000	12, 500	1, 348, 105	68, 584	133, 023	18, 873

Fisheries of New York, 1930—Continued

CATCH: BY GEAR—Continued

Species	Gill nets—Continued						Lines—Hand	
	Drift		Runaround		Stake			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	10,800	$226			400	$24		
Bluefish	6,050	825	292,580	$25,112	1,900	130	178,020	$17,948
Butterfish			5,000	448				
Carp	1,426	225			8,059	1,158		
Cod							152,617	6,730
Flounders							30,450	522
Hake							9,000	110
Mackerel	195,460	6,088					8,500	510
Pollock							91,575	2,498
Scup or porgy					150	5	15,400	1,016
Sea bass							102,350	11,795
Shad	148,372	24,168			17,173	3,763		
Squeteagues or "sea trout," gray	550	75	103,285	8,604	16,800	775	27,880	2,705
Striped bass			1,000	120	344	114	7,400	615
Sturgeon	1,211	401			225	59		
Suckers					755	85		
Tautog							26,100	1,980
Tuna or "horse mackerel"	220	15						
White perch					1,483	155		
Total	364,089	32,023	401,865	34,284	47,289	6,268	649,292	46,429

Species	Lines—Continued						Pound nets	
	Trawl		Trot, with hooks		Troll			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore							59,900	$2,050
Alewives							89,950	1,041
Bluefish					4,980	$542	289,748	25,814
Bonito							186,589	13,733
Butterfish							689,105	53,129
Carp			325	$47				
Catfish and bullheads			64	13				
Cod	1,621,294	$59,097					37,159	1,652
Eels	11,500	1,495	5,572	1,108			175,410	23,826
Flounders	300	30					263,892	10,431
Grayfish	1,250	38						
Haddock	31,895	1,254						
Hake	23,112	679						
Herring, sea							32,456	674
King whiting or "kingfish"							13,976	1,817
Mackerel							239,300	13,022
Menhaden							124,000	1,240
Scup or porgy							391,445	19,928
Sea bass							48,886	4,753
Sea robin							11,139	243
Shad							283	48
Sharks							450	23
Skates	24,350	241					150	2
Spot							3,878	309
Squeteagues or "sea trout," gray							471,227	33,036
Striped bass							13,893	1,380
Tautog							38,035	3,037
Tilefish	2,312,200	88,415						
Tuna or "horse mackerel"							19,380	2,286
White perch							750	25
Whiting							337,940	10,140
Crabs, hard							7,334	880
Squid							473,597	19,947
Total	4,025,901	151,249	5,961	1,168	4,980	542	4,019,872	243,966

Fisheries of New York, 1930—Continued

CATCH: BY GEAR—Continued

Species	Floating traps		Stop nets		Fyke nets		Dip nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			234	$7	19, 067	$250		
Butterfish	45, 686	$4, 569						
Carp			44, 450	6, 189	7, 663	871		
Catfish and bullheads			1, 800	225	12, 791	2, 300		
Cod	496	27						
Eels					3, 860	614		
Flounders	137, 850	8, 960			1, 387, 440	26, 528		
Hake	526	26						
King whiting or "kingfish"	45	4						
Mackerel	21, 475	1, 123						
Pike or pickerel			53	5	90	21		
Pollock	3, 520	70						
Scup or porgy	31, 561	1, 262						
Sea bass	35, 777	2, 503						
Sea robin	3, 115	62						
Shad			60	9				
Skates	3, 013	90						
Smelt							200	$10
Squeteagues or "sea trout," gray	509	74						
Striped bass			200	60	12	1		
Suckers			3, 261	383	21, 617	2, 361		
Sunfish			37	2	1, 065	109		
Tautog	1, 157	57			7, 900	766		
Tomcod					120, 678	4, 799		
White perch					10, 356	1, 779		
Whiting	11, 327	227						
Yellow perch					3, 931	463		
Crabs:								
Hard					36, 975	1, 110	43, 100	3, 774
Soft							5, 576	1, 704
Shrimp							510	50
Squid	60, 387	1, 810						
Scallops, bay							11, 130	2, 340
Total	356, 444	20, 864	50, 095	6, 880	1, 633, 445	41, 972	60, 516	7, 878

Species	Scap nets		Drag nets		Push nets		Otter trawls			
							Fish		Scallop	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	40, 907	$2, 226								
Bluefish							200	$15		
Butterfish							3, 000	299		
Carp	38, 959	4, 676								
Catfish and bullheads	577	90								
Cod							986, 890	27, 609		
Croaker							325, 000	8, 125		
Eels	117	22								
Floundecs							4, 667, 957	168, 341		
Haddork							2, 535, 760	75, 583		
Hake							110, 117	1, 631		
Halibut							4, 895	968		
Minnows	200	70								
Mummichog					40	$4				
Pike or pickerel	162	28								
Pollock							16, 335	219		
Rosefish							1, 375	41		
Scup or porgy							151, 025	1, 546		
Sea bass							31, 688	1, 756		
Shad	126	56								
Silversides					40	4				
Smelt	350	88								
Squeteagues or "sea trout," gray							1, 520	50		
Striped bass							200	9		
Suckers	7, 757	1, 118								
Sunfish	265	28								
Tautog							8, 985	356		
Tomcod	127	19								
White perch	2, 183	165								
Wolffish							6, 425	113		
Yellow perch	884	107								
Crabs, hard			67, 500	$2, 025						
Lobsters							400	120		
Shrimp			49, 600	12, 400	20	8				
Clams, soft, private							192	12		
Conchs							1, 710	152		
Scallops:										
Bay					23, 580	4, 840				
Sea			7, 902	1, 756					13, 500	$1, 875
Total	92, 614	8, 693	125, 002	16, 181	23, 680	4, 856	8, 853, 674	286, 945	13, 500	1, 875

Fisheries of New York, 1930—Continued

CATCH: BY GEAR—Continued

Species	Otter trawls—Shrimp		Pots						Harpoons	
			Crab		Eel		Lobster			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels					267,664	$36,921				
Flounders					1,400	262				
Mummichog					23,495	2,241				
Sea bass							101,050	$3,661		
Swordfish									234,140	$37,887
Crabs:										
Hard			5,685	$753			3,650	165		
Rock					640	80				
Lobsters							535,991	136,572		
Shrimp	45,000	$1,800								
Total	45,000	1,800	5,685	753	293,199	39,504	640,691	140,398	234,140	37,887

Species	Spears		Dredges							
			Clam		Mussel		Oyster		Scallop	
	Lbs.	*Value*	*Lbs.*	*Value*	*Lbs.*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels	65,924	$10,907								
Flounders	5,315	710								
Clams:										
Hard, private							1,200	$500		
Surf or skimmers			224,950	$18,340						
Conchs									33,516	$2,793
Mussels					235,400	$10,762	21,600	648		
Oysters:										
Market, private, spring							4,703,979	1,111,178		
Market, private, fall							4,456,998	1,030,107		
Seed, public, fall							4,200	450		
Seed, private, spring							738,878	130,006		
Seed, private, fall							2,854,610	381,550		
Scallops:										
Bay									357,633	106,763
Sea									1,317,060	227,115
Total	71,239	11,617	224,950	18,340	235,400	10,762	12,781,465	2,654,439	1,708,209	336,671

Species	Tongs		Rakes		Forks		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, hard	200	$2	700	$7				
Clams:								
Hard, public	382,588	165,015	371,220	175,191			39,848	$18,096
Hard, private	44,980	17,622						
Razor					3,080	$756		
Soft, public			137,250	13,088	364,725	57,360		
Surf or skimmers	66,320	16,299						
Mussels	6,500	325					8,000	250
Oysters:								
Market, public, spring	8,767	2,166						
Market, public, fall	7,521	1,858						
Market, private, spring	37,800	12,100						
Market, private, fall	48,160	15,556						
Seed, public, spring	62,720	8,975	70,000	8,500				
Seed, public, fall	67,515	9,675	12,600	1,700			11,900	1,635
Scallops, bay			2,268	689			2,100	642
Bloodworms					54,404	62,588		
Sandworms					58,420	61,170		
Total	733,071	249,593	594,038	199,175	480,629	181,874	61,848	20,623

Fisheries of New York, 1930—Continued

OPERATING UNITS: BY COUNTIES

Item	Albany	Bronx	Columbia	Dutchess	Greene	Kings	Nassau	New York	Orange
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels						148	46	130	
On boats and shore—									
Regular			2	2	2	187	215		2
Casual	10	2	32	104	35	109	137		41
Total	10	2	34	106	37	444	398	130	43
Vessels:									
Motor—									
5 to 10 tons						22	3	4	
11 to 20 tons						8	6	6	
21 to 30 tons						5	2	5	
31 to 40 tons								1	
41 to 50 tons								2	
51 to 60 tons								1	
61 to 70 tons								1	
Total						35	11	20	
Net tonnage						403	164	489	
Sail—21 to 30 tons						1			
Net tonnage						27			
Total vessels						36	11	20	
Total net tonnage						430	164	489	
Boats:									
Motor				6		91	34		1
Other	7	2	19	44	27	8	205		21
Accessory boats						6	1	57	
Apparatus:									
Purse seines—									
Other						1			
Length, yards						400			
Haul seines	2		6	5	7	5	18		10
Length, yards	216		602	631	707	65	996		1, 220
Gill nets—									
Drift			1	31	1		50	420	9
Square yards			2, 000	96, 670	1, 050		40, 400	75, 600	26, 988
Runaround							18		
Square yards							37, 700		
Stake				1	1				
Square yards				800	66				
Lines—									
Hand						38		6	
Hooks						66		12	
Trawl						68	23	40	
Hooks						79, 000	48, 425	60, 900	
Trot, with hooks				3					1
Hooks				710					150
Troll						16			
Hooks						16			
Pound nets							4		
Stop nets			2	2	3				1
Square yards			1, 525	2, 017	3, 464				498
Fyke nets	22		33	55	37				52
Dip nets							22		
Scap nets	5		12	35	16				12
Drag nets							3		
Yards at mouth							5		
Push nets							1		
Otter trawls—									
Fish						30	4	4	
Yards at mouth						649	87	125	
Shrimp							1		
Yards at mouth							30		
Pots—									
Crab						36			
Eel				3		112	440		15
Lobster						6, 933	3, 655		
Harpoons						1		2	
Spears						11	55		
Dredges—									
Clam						15			
Yards at mouth						15			
Mussel							6		
Yards at mouth							7		
Oyster							17	18	
Yards at mouth							20	27	
Scallop						30	6	4	
Yards at mouth						82	16	11	
Tongs		2					182		
Rakes							70		
Forks						125	143		

Fisheries of New York, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Putnam	Queens	Rensselaer	Richmond	Rockland	Saratoga	Suffolk	Ulster	Westchester
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		2		2			376		3
On boats and shore—									
Regular				6			809	4	7
Casual	1	2	18	6	44	3	409	146	58
Total	1	4	18	14	44	3	1,594	150	68
Vessels:									
Steam—31 to 40 tons							1		
Net tonnage							36		
Motor—									
5 to 10 tons				1			63		1
11 to 20 tons		1					23		
21 to 30 tons							9		
31 to 40 tons							1		
41 to 50 tons							2		
51 to 60 tons							1		
Total		1		1			99		1
Net tonnage		16		7			1,188		8
Sail—									
5 to 10 tons							8		
11 to 20 tons							1		
Total							9		
Net tonnage							61		
Total vessels		1		1			109		1
Total net tonnage		16		7			1,285		8
Boats:									
Motor				8	4		410	4	4
Other	1	1	15		21	3	597	78	31
Accessory boats							15		
Apparatus:									
Purse seines—									
Menhaden							4		
Length, yards							1,340		
Haul seines		1	3	1	3		69	5	6
Length, yards		100	534	5	600		13,486	542	799
Gill nets—									
Anchor					27		38	10	123
Square yards					460		32,129	100	1,698
Drift					7		4	47	11
Square yards					21,010		7,200	137,536	42,532
Runaround							22		
Square yards							33,920		
Stake					10		67	18	13
Square yards					5,843		13,280	2,887	12,943
Lines—									
Hand							46		
Hooks							50		
Trawl							1,766		
Hooks							90,900		
Trot, with hooks	1		1		4			4	1
Hooks	150		60		760			510	300
Troll							4		
Hooks							4		
Pound nets							414		
Floating traps							9		
Stop nets	1							8	1
Square yards	66							5,201	399
Fyke nets			23		2		2,089	66	33
Dip nets							43		
Scap nets			12		1	3		61	1
Drag nets							15		
Yards at mouth							27		
Push nets							28		
Otter trawls—									
Fish		1		1			74		
Yards at mouth		30		19			1,977		
Scallop							1		
Yards at mouth							12		
Pots—									
Crab					18				
Eel	2				35		3,718	8	58
Lobster				1,150			6,085		18

Fisheries of New York, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Putnam	Queens	Rensselaer	Richmond	Rockland	Saratoga	Suffolk	Ulster	Westchester
Apparatus—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Harpoons							17		1
Spears							72		1
Dredges—									
Clam				1					
Yards at mouth				1					
Mussel							2		
Yards at mouth							3		
Oyster							70		
Yards at mouth							97		
Scallop				2			1, 168		
Yards at mouth				4			1, 083		
Tongs							418		3
Rakes							384		1
Forks				4			184		

CATCH: BY COUNTIES

Species	Albany		Bronx		Columbia		Dutchess		Greene	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	3, 500	$145			33, 560	$1, 135	9, 510	$585	8, 935	$404
Carp	3, 880	392			26, 220	3, 104	9, 507	1, 223	20, 641	2, 798
Catfish and bullheads	150	23			3, 371	625	1, 880	409	6, 026	862
Eels					200	40	3, 844	737	100	13
Minnows									100	20
Pike or pickerel	495	70					15	4		
Shad					947	120	49, 164	8, 506	230	59
Striped bass							282	56		
Sturgeon							700	210		
Suckers	3, 190	291			8, 608	872	2, 937	398	1, 461	154
Sunfish					20	2	660	72		
Tomcod					100	15				
White perch							408	47		
Yellow perch					3, 085	339	584	103	186	24
Clams, hard, public			160	$120						
Total	11, 215	921	160	120	76, 111	6, 252	79, 491	12, 350	37, 679	4, 334

Species	Kings		Nassau		New York		Orange	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives							2, 130	$131
Bluefish	156, 360	$14, 269	137, 835	$9, 663				
Butterfish			5, 000	448	3, 000	$299		
Carp							15, 858	2, 208
Catfish and bullheads							1, 327	272
Cod	972, 975	31, 526	309, 735	10, 488	449, 820	11, 203		
Croaker	325, 000	8, 125						
Eels	17, 600	2, 288	45, 980	7, 578			1, 957	375
Flounders	695, 750	23, 274	141, 950	6, 852	370, 177	12, 160		
Haddock	661, 150	20, 655			1, 677, 030	46, 295		
Hake	64, 650	963	770	21	55, 117	721		
Halibut	1, 700	340			3, 195	628		
Mackerel			43, 350	1, 018	152, 110	5, 070		
Minnows							194	68
Mummichog	26, 100	3, 905	23, 855	2, 244				
Pollock					16, 335	219		
Rosefish					1, 375	41		
Scup or porgy	656, 500	9, 325	250	15				
Sea bass	46, 500	3, 430	98, 550	3, 355	550	55		
Shad							9, 328	2, 021
Silversides	1, 050	63	20, 035	2, 807				
Skates			600	3				
Squeteagues or "sea trout," gray	201, 000	5, 018	26, 250	1, 601				
Striped bass			7, 600	1, 900			235	47
Suckers							8, 575	1, 095

Fisheries of New York, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Kings		Nassau		New York		Orange	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Swordfish	44, 610	$7, 969	--------	--------	90, 080	$16, 061	--------	--------
Tautog	22, 500	1, 575	--------	--------	600	60	--------	--------
Tilefish	346, 900	19, 103	--------	--------	1, 965, 300	69, 312	--------	--------
Tuna or "horse mackerel"	--------	--------	--------	--------	220	15	--------	--------
White perch	--------	--------	--------	--------	--------	--------	570	$72
Wolffish	--------	--------	--------	--------	6, 425	113	--------	--------
Crabs:								
Hard	3, 685	503	3, 400	$129	--------	--------	--------	--------
Rock	--------	--------	640	80	--------	--------	--------	--------
Soft	--------	--------	2, 480	930	--------	--------	--------	--------
Lobsters	295, 850	68, 020	52, 400	16, 487	--------	--------	--------	--------
Shrimp	--------	--------	46, 120	2, 083	--------	--------	--------	--------
Clams:								
Hard, public	--------	--------	195, 944	85, 609	--------	--------	--------	--------
Hard, private	--------	--------	400	200	--------	--------	--------	--------
Razor	--------	--------	3, 080	756	--------	--------	--------	--------
Soft, public	17, 700	2, 360	139, 350	23, 000	--------	--------	--------	--------
Soft, private	192	12	--------	--------	--------	--------	--------	--------
Surf or skimmers	203, 350	16, 315	9, 000	1, 969	--------	--------	--------	--------
Conchs	25, 650	2, 147	--------	--------	--------	--------	--------	--------
Mussels	8, 000	250	197, 500	8, 435	--------	--------	--------	--------
Oysters:								
Market, public, fall	--------	--------	14	4	--------	--------	--------	--------
Market, private, spring	--------	--------	431, 900	114, 450	721, 497	103, 057	--------	--------
Market, private, fall	--------	--------	393, 792	91, 901	744, 198	106, 314	--------	--------
Seed, public, fall	--------	--------	7, 700	825	--------	--------	--------	--------
Seed, private, spring	--------	--------	--------	--------	14, 000	2, 000	--------	--------
Seed, private, fall	--------	--------	550, 000	60, 000	2, 187, 010	303, 000	--------	--------
Scallops:								
Bay	--------	--------	6, 048	1, 833	--------	--------	--------	--------
Sea	805, 434	145, 343	153, 000	25, 500	82, 500	13, 800	--------	--------
Bloodworms	28, 110	29, 454	14, 839	18, 096	--------	--------	--------	--------
Sandworms	28, 110	29, 454	3, 708	3, 798	--------	--------	--------	--------
Total	5, 656, 426	445, 686	3, 073, 075	504, 078	8, 540, 539	690, 423	40, 174	6, 289

Species	Putnam		Queens		Rennselaer		Richmond		Rockland	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	--------	--------	--------	--------	4, 452	$182	--------	--------	12	$1
Carp	210	$31	100	$12	10, 242	1, 168	--------	--------	7, 100	790
Catfish and bullheads	--------	--------	--------	--------	1, 989	364	--------	--------	69	13
Eels	495	86	--------	--------	631	158	--------	--------	2, 376	281
Flounders	--------	--------	90, 000	1, 350	--------	--------	36, 547	$1, 462	--------	--------
Minnows	--------	--------	--------	--------	100	50	--------	--------	--------	--------
Mummichog	--------	--------	--------	--------	--------	--------	1, 500	300	--------	--------
Pike or pickerel	53	5	--------	--------	52	8	--------	--------	--------	--------
Shad	--------	--------	--------	--------	55	15	--------	--------	6, 234	1, 391
Striped bass	--------	--------	--------	--------	--------	--------	--------	--------	820	219
Sturgeon	--------	--------	--------	--------	--------	--------	--------	--------	71	17
Suckers	--------	--------	--------	--------	2, 731	292	--------	--------	2, 125	212
Sunfish	--------	--------	--------	--------	179	18	--------	--------	--------	--------
White perch	--------	--------	--------	--------	--------	--------	--------	--------	1, 016	123
Yellow perch	--------	--------	--------	--------	5	1	--------	--------	--------	--------
Crabs: Hard	--------	--------	--------	--------	--------	--------	3, 650	165	2, 000	250
Lobsters	--------	--------	--------	--------	--------	--------	22, 000	5, 505	--------	--------
Clams, surf or skimmers	--------	--------	--------	--------	--------	--------	21, 600	2, 025	--------	--------
Conchs	--------	--------	--------	--------	--------	--------	9, 576	798	--------	--------
Sandworms	--------	--------	--------	--------	--------	--------	300	300	--------	--------
Total	758	122	90, 100	1, 362	20, 436	2, 256	95, 173	10, 555	21, 823	3, 297

Fisheries of New York, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Saratoga		Suffolk		Ulster		Westchester	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Albacore	-----	-----	59, 900	$2, 050	-----	-----	-----	-----
Alewives	-----	-----	540, 450	6, 266	28, 690	$1, 179	455	$25
Bluefish	-----	-----	526, 885	53, 725	-----	-----	-----	-----
Bonito	-----	-----	186, 589	13, 733	-----	-----	-----	-----
Butterfish	-----	-----	734, 791	57, 698	-----	-----	-----	-----
Carp	1, 290	$153	20, 250	3, 225	45, 178	6, 455	9, 974	1, 312
Catfish and bullheads	50	5	-----	-----	1, 223	264	1, 453	234
Cod	-----	-----	1, 069, 776	42, 003	-----	-----	-----	-----
Eels	-----	-----	551, 063	64, 298	966	153	12, 265	1, 371
Flounders	-----	-----	5, 165, 480	171, 216	-----	-----	-----	-----
Grayfish	-----	-----	1, 250	38	-----	-----	-----	-----
Haddock	-----	-----	229, 475	9, 887	-----	-----	-----	-----
Hake	-----	-----	22, 218	741	-----	-----	-----	-----
Herring, sea	-----	-----	32, 456	674	-----	-----	-----	-----
King whiting or "kingfish"	-----	-----	14, 021	1, 821	-----	-----	-----	-----
Mackerel	-----	-----	269, 275	14, 655	-----	-----	-----	-----
Menhaden	-----	-----	4, 599, 640	19, 423	-----	-----	-----	-----
Minnows	-----	-----	147, 000	4, 200	300	100	-----	-----
Mummichog	-----	-----	58, 700	2, 718	-----	-----	-----	-----
Pike or pickerel	-----	-----	-----	-----	50	10	40	11
Pollock	-----	-----	95, 095	2, 568	-----	-----	-----	-----
Scup or porgy	-----	-----	432, 831	21, 917	-----	-----	-----	-----
Sea bass	-----	-----	174, 151	17, 628	-----	-----	-----	-----
Sea robin	-----	-----	14, 654	315	-----	-----	-----	-----
Shad	-----	-----	2, 158	579	77, 831	11, 231	21, 215	4, 345
Sharks	-----	-----	450	23	-----	-----	-----	-----
Silversides	-----	-----	239, 325	9, 525	-----	-----	-----	-----
Skates	-----	-----	26, 913	330	-----	-----	-----	-----
Smelt	-----	-----	2, 750	780	350	88	-----	-----
Spot	-----	-----	3, 878	309	-----	-----	-----	-----
Squeteagues or "sea trout," gray	-----	-----	712, 118	60, 546	-----	-----	-----	-----
Striped bass	-----	-----	56, 593	8, 878	-----	-----	910	244
Sturgeon	-----	-----	-----	-----	511	191	828	192
Suckers	1, 175	135	-----	-----	6, 710	774	6, 840	831
Sunfish	-----	-----	-----	-----	747	68	422	51
Swordfish	-----	-----	91, 450	12, 950	-----	-----	8, 000	907
Tautog	-----	-----	59, 077	4, 561	-----	-----	-----	-----
Tomcod	-----	-----	120, 050	4, 751	155	17	500	35
Tuna or "horse mackerel"	-----	-----	19, 380	2, 286	-----	-----	-----	-----
Whitebait	-----	-----	95, 800	7, 140	-----	-----	-----	-----
White perch	-----	-----	12, 000	2, 220	2, 457	186	4, 340	422
Whiting	-----	-----	349, 267	10, 367	-----	-----	-----	-----
Yellow perch	-----	-----	-----	-----	1, 205	138	-----	-----
Crabs:								
Hard	-----	-----	152, 409	7, 669	-----	-----	-----	-----
Soft	-----	-----	3, 096	774	-----	-----	-----	-----
Lobsters	-----	-----	165, 916	46, 590	-----	-----	225	90
Shrimp	-----	-----	49, 410	12, 235	-----	-----	-----	-----
Squid	-----	-----	533, 984	21, 757	-----	-----	-----	-----
Clams:								
Hard, public	-----	-----	591, 408	269, 743	-----	-----	6, 144	2, 830
Hard, private	-----	-----	45, 780	17, 922	-----	-----	-----	-----
Soft, public	-----	-----	344, 925	45, 088	-----	-----	-----	-----
Surf or skimmers	-----	-----	57, 320	14, 330	-----	-----	-----	-----
Mussels	-----	-----	66, 000	3, 300	-----	-----	-----	-----
Oysters:								
Market, public, spring	-----	-----	8, 767	2, 166	-----	-----	-----	-----
Market, public, fall	-----	-----	7, 507	1, 854	-----	-----	-----	-----
Market, private, spring	-----	-----	3, 588, 382	905, 771	-----	-----	-----	-----
Market, private, fall	-----	-----	3, 367, 168	847, 448	-----	-----	-----	-----
Seed, public, spring	-----	-----	132, 720	17, 475	-----	-----	-----	-----
Seed, public, fall	-----	-----	88, 515	12, 635	-----	-----	-----	-----
Seed, private, spring	-----	-----	724, 878	128, 006	-----	-----	-----	-----
Seed, private, fall	-----	-----	117, 600	18, 550	-----	-----	-----	-----
Scallops:								
Bay	-----	-----	390, 663	113, 441	-----	-----	-----	-----
Sea	-----	-----	297, 528	46, 103	-----	-----	-----	-----
Bloodworms	-----	-----	11, 455	15, 038	-----	-----	-----	-----
Sandworms	-----	-----	26, 302	27, 618	-----	-----	-----	-----
Total	2, 515	293	27, 508, 892	3, 211, 557	166, 373	20, 854	73, 611	12, 900

Industries related to the fisheries of New York, 1930

TRANSPORTING

Item	Nassau County	Suffolk County	Total
	Number	*Number*	*Number*
Persons engaged on vessels	15	46	61
Vessels, motor—			
5 to 10 tons	1	13	14
11 to 20 tons	1	2	3
21 to 30 tons		3	3
31 to 40 tons	2	2	4
Total	4	20	24
Net tonnage	93	264	357

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Albany, Dutchess, and Orange Counties	Bronx County	Kings and Queens Counties	Nassau County	New York County	Suffolk County	Total
Establishments	5	4	22	11	178	26	246
Persons engaged:							
Proprietors	4	6	23	13	187	24	257
Salaried employees	12	10	51	6	579	19	677
Wage earners—							
Average for season	125	34	152	40	1,209	285	1,845
Average for year	124	34	146	26	1,159	197	1,686
Paid to salaried employees	$45,893	$62,750	$203,703	$9,600	$2,166,945	$61,930	$2,550,821
Paid to wage earners	85,396	58,660	254,517	29,420	2,187,755	253,473	2,869,221
Total salaries and wages	131,289	121,410	458,220	39,020	4,354,700	315,403	5,420,042

PRODUCTS MANUFACTURED

Item		Quantity	Value
Buffalofish, smoked	pounds	742,452	$312,043
Butterfish, smoked	do	565,548	168,355
Chubs, smoked	do	1,096,923	374,444
Ciscoes, smoked	do	1,133,405	445,501
Cod, fresh fillets	do	1,842,400	297,591
Eels, smoked	do	2,531	868
Flounders, fresh fillets	do	254,000	58,170
Haddock:			
Fresh fillets	do	3,103,463	535,925
Smoked fillets	do	106,500	24,300
Finnan haddie	do	755,500	93,622
Hake, fresh fillets	do	147,000	19,777
Herring, sea, smoked	do	176,951	33,949
Lake trout, smoked	do	48,683	15,183
Mackerel, smoked	do	133,181	22,988
Salmon, smoked	do	5,081,491	1,918,417
Shad, smoked	do	61,859	12,444
Sturgeon:			
Smoked	do	1,846,724	1,386,646
Caviar, canned	standard cases	7,993	1,002,945
Tullibee, smoked	pounds	763,760	217,857
Whitefish:			
Smoked	do	150,719	47,540
Caviar, canned	standard cases	373	14,154
Marine-shell products:			
Buttons	gross	748,718	626,874
Novelties		(1)	131,184
Oysters, fresh-shucked	gallons	252,192	661,816

[1] Data not available.

Industries related to the fisheries of New York, 1930—Continued

WHOLESALE AND MANUFACTURING—Continued

PRODUCTS MANUFACTURED—Continued

Item	Quantity	Value
Unclassified products:		
Smoked [2] .... pounds	42,500	$9,750
Canned [3]	(1)	174,113
Miscellaneous [4]	(1)	381,145
Total	----------	8,987,001

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 504]

Item	Quantity	Value
Scallops, bay, fresh-shucked .... gallons	39,501	$129,633
Scallops, sea, fresh-shucked .... do	140,677	282,529
Total .... do	180,178	412,162

[1] Data not available.

[2] Includes smoked cod fillets, and kippered herring.

[3] Includes canned salmon roe and caviar; canned spiced and soused salmon; canned pickled and smoked eels; canned pickled mussels; canned turtle soup and meat; canned terrapin meat and stew; and canned hard-clam products.

[4] Includes fresh pollock fillets; shucked scallops; fish meal; and fresh-water mussel-shell buttons.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 457 have also been included as fishermen. This fact should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

NEW JERSEY

Fisheries of New Jersey, 1930

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets				Lines	
	Menhaden	Other		Anchor	Drift	Run-around	Stake	Hand	Trawl
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	21	137	--------	--------	22	--------	--------	38	70
On boats and shore—									
Regular	--------	--------	74	4	122	129	41	193	280
Casual	--------	--------	170	6	174	19	70	85	53
Total	21	137	244	10	318	148	111	316	403
Vessels:									
Motor—									
5 to 10 tons	--------	2	--------	--------	3	--------	--------	1	3
11 to 20 tons	--------	10	--------	--------	2	--------	--------	6	12
21 to 30 tons	--------	3	--------	--------	--------	--------	--------	1	--------
61 to 70 tons	1	--------	--------	--------	--------	--------	--------	--------	--------
Total	1	15	--------	--------	5	--------	--------	8	15
Net tonnage	70	236	--------	--------	51	--------	--------	114	172
Boats:									
Motor	--------	--------	20	4	121	70	35	165	159
Other	--------	--------	82	2	58	--------	29	13	--------
Accessory boats	2	21	--------	--------	3	--------	14	12	--------
Apparatus:									
Number	1	15	102	5	862	90	1,340	555	824
Length, yards	456	5,880	11,898	--------	--------	--------	--------	--------	--------
Square yards	--------	--------	--------	5,940	658,830	405,674	161,823	--------	--------
Hooks, baits, or snoods	--------	--------	--------	--------	--------	--------	--------	793	503,450

Fisheries of New Jersey, 1930—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Lines—Contd.		Pound nets	Weirs	Stop nets	Fyke nets	Dip nets	Cast nets	Drag nets
	Troll	Trot, with baits or snoods							
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	5	--------	253	--------	--------	--------	--------	--------	--------
On boats and shore—									
Regular	70	4	138	7	20	41	18	--------	4
Casual	35	3	19	23	86	85	19	4	2
Total	110	7	410	30	106	126	37	4	6
Vessels:									
Motor—									
5 to 10 tons	--------	--------	38	--------	--------	--------	--------	--------	--------
11 to 20 tons	1	--------	--------	--------	--------	--------	--------	--------	--------
Total	1	--------	38	--------	--------	--------	--------	--------	--------
Net tonnage	11	--------	230	--------	--------	--------	--------	--------	--------
Boats:									
Motor	81	3	23	4	9	32	10	--------	3
Other	--------	1	1	16	50	50	23	1	--------
Accessory boats	--------	--------	12	--------	--------	--------	--------	--------	--------
Apparatus:									
Number	304	4	181	83	60	1,772	36	4	6
Square yards	--------	--------	--------	--------	34,704	--------	--------	--------	--------
Yards at mouth	--------	--------	--------	--------	--------	--------	--------	--------	17
Hooks, baits, or snoods	316	1,775	--------	--------	--------	--------	--------	--------	--------

Item	Otter trawls		Pots			Spears	Dredges	
	Fish	Shrimp	Crab	Eel	Lobster		Clam	Crab
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	141	11	--------	--------	--------	--------	180	17
On boats and shore—								
Regular	50	--------	--------	76	257	43	10	--------
Casual	1	--------	1	41	20	17	2	1
Total	192	11	1	117	277	60	192	18
Vessels:								
Motor—								
5 to 10 tons	12	2	--------	--------	--------	--------	5	5
11 to 20 tons	16	1	--------	--------	--------	--------	12	2
21 to 30 tons	1	--------	--------	--------	--------	--------	2	--------
31 to 40 tons	2	--------	--------	--------	--------	--------	--------	--------
41 to 50 tons	1	--------	--------	--------	--------	--------	1	--------
51 to 60 tons	1	--------	--------	--------	--------	--------	--------	--------
61 to 70 tons	1	--------	--------	--------	--------	--------	--------	--------
71 to 80 tons	1	--------	--------	--------	--------	--------	--------	--------
Total	35	3	--------	--------	--------	--------	20	7
Net tonnage	640	27	--------	--------	--------	--------	310	69
Boats:								
Motor	21	--------	--------	64	156	8	6	1
Other	--------	--------	--------	26	--------	51	--------	--------
Accessory boats	--------	--------	--------	6			--------	--------
Apparatus:								
Number	61	3	4	5,299	33,920	60	56	53
Yards at mouth	1,331	72	--------	--------	--------	--------	62	59

Fisheries of New Jersey, 1930—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Dredges—Con.		Tongs	Rakes	Forks	Hoes	Gaffs	By hand	Total, exclusive of duplication
	Oyster	Scallop							
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	2,687	41							3,292
On boats and shore—									
Regular	19		551	488	15	46	8	88	1,747
Casual	6		326	211	3	30	24	76	1,177
Total	2,712	41	877	699	18	76	32	164	6,216
Vessels:									
Motor—									
5 to 10 tons	43	2							106
11 to 20 tons	93								128
21 to 30 tons	23	1							28
31 to 40 tons	8								10
41 to 50 tons	4								5
51 to 60 tons	4	1							5
61 to 70 tons	1								2
71 to 80 tons	1								2
Total	177	4							286
Net tonnage	3,096	96							4,434
Sail—									
5 to 10 tons	18								18
11 to 20 tons	20								20
21 to 30 tons	15								15
31 to 40 tons	8								8
41 to 50 tons	5								5
51 to 60 tons	4								4
61 to 70 tons	5								5
71 to 80 tons	1								1
91 to 100 tons	1								1
Total	77								77
Net tonnage	2,085								2,085
Total vessels	254	4							363
Total net tonnage	5,181	96							6,519
Boats:									
Motor	16		521	416	4	12		37	1,379
Other			318	254	17	58	1	84	750
Accessory boats			37	14					121
Apparatus:									
Number	537	9	868	667	19	74	32		
Yards at mouth	634	29							

CATCH: BY GEAR

Species	Purse seines				Haul seines		Gill nets	
	Menhaden		Other				Anchor	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore			50	$3				
Alewives					40,986	$878		
Bluefish			322,457	33,951	1,062	190	950	$122
Bonito			908	81				
Butterfish			15,670	1,248				
Carp					25,601	2,938		
Catfish and bullheads					11,340	988		
Cod			4,860	59				
Croaker			132,340	2,976	44,889	1,633		
Eels					1,050	113		
Flounders			372	21	48,900	4,138		
Herring, sea					1,500	30		
King whiting or "kingfish"			20	2	1,605	182		
Mackerel			160	13				
Menhaden	3,663,000	$19,250	997,285	8,387			3,510	27
Minnows					18,000	220		

Fisheries of New Jersey, 1930—Continued

CATCH: BY GEAR—Continued

Species	Purse seines				Haul seines		Gill nets	
	Menhaden		Other				Anchor	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Mummichog					16,000	$200		
Scup			3,343,693	$63,223				
Sea bass			251,145	5,213				
Shad					10,748	3,811	156	$46
Spanish mackerel			778	54				
Spot					4,852	273		
Squeteague or "sea trout," gray			2,239,720	56,381	71,885	5,879	450	26
Striped bass					7,803	2,025		
Sturgeon					128	51		
Suckers					23,397	2,290		
White perch					27,475	2,764		
Yellow perch					4,800	344		
Total	3,663,000	$19,250	7,309,458	171,612	362,021	28,947	5,066	221

Species	Gill nets—Continued						Lines	
	Drift		Runaround		Stake		Hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	3,648	$148			2,204	$62		
Bluefish	14,812	1,511	259,603	$21,374	25,689	3,866	1,425,052	$164,635
Bonito							114,752	5,239
Butterfish	27,102	2,219	2,520	402				
Carp	430	48					290	44
Catfish and bullheads					200	14		
Cero							20,000	2,000
Cod							136,642	3,347
Croaker	69,965	2,070	200	8	30	3	28,566	1,168
Dolphin							332	24
Eels							6,420	641
Flounders			8	1			32,665	2,206
Hake			462	5				
Herring, sea			14	1				
King whiting or "kingfish"	50	3			500	75	100	8
Mackerel	434,026	15,294	164,000	6,400				
Menhaden	20,000	200	22,065	243				
Pilotfish							414	17
Scup	2,350	61	1,000	40			71,010	1,416
Sea bass			2,500	75			270,934	7,403
Shad	144,419	27,159			44,829	6,469		
Skates							3,750	95
Snapper, red							4,000	400
Spanish mackerel							1,891	132
Spot	89,870	4,529	2,743	119	2,500	175	900	45
Squeteague or "sea trout," gray	223,900	9,711	189,604	7,787	9,406	905	77,392	3,529
Striped bass					5,784	1,547	16,820	817
Sturgeon	995	521						
Tautog							21,999	879
Tuna or "horse mackerel"							800	80
White perch					46,942	6,008		
Yellow perch					1,010	71		
Total	1,031,567	63,474	644,719	36,455	139,094	19,195	2,234,729	194,251

Fisheries of New Jersey, 1930—Continued

CATCH: BY GEAR—Continued

Species	Lines—Continued						Pound nets	
	Trawl		Troll		Trot, with baits or snoods			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore							31, 064	$506
Bluefish			334, 677	$30, 822			576, 219	56, 064
Bonito							114, 586	7, 841
Butterfish							2, 340, 296	173, 985
Cod	6, 403, 463	$194, 515					935, 563	30, 815
Croaker							511, 972	20, 805
Cusk	6, 500	65					1, 900	19
Dolphin							800	16
Drum:								
Black							6, 784	126
Red or redfish							64, 666	11, 635
Eels							10, 278	1, 028
Flounders	8, 000	800					401, 303	29, 370
Goosefish							37, 892	1, 118
Grayfish							11, 440	229
Haddock	15	1					5, 782	204
Hagfish							7, 200	72
Hake	14, 000	440					205, 855	3, 510
Herring, sea							587, 533	5, 875
King whiting or "kingfish"							61, 148	6, 785
Mackerel							55, 742	3, 699
Menhaden							1, 208, 850	13, 226
Mullet							150	6
Pilotfish							2, 046	106
Pollock							2, 964	111
Scup							2, 733, 907	87, 513
Sea bass							1, 218, 246	61, 332
Sea robin							117, 747	1, 946
Shad							23, 559	3, 641
Sharks							175, 669	3, 699
Skates	31, 636	907					204, 905	3, 366
Spanish mackerel			250	13			12, 920	1, 297
Spot							437, 336	17, 340
Squeteague or "sea trout," gray							8, 054, 464	264, 131
Striped bass							5, 105	971
Sturgeon							280	200
Tautog							133, 650	4, 462
Thimble-eyed mackerel							35, 722	1, 115
Tuna or "horse mackerel"							36, 762	2, 393
White perch							2, 020	80
Whiting							3, 754, 942	59, 428
Crabs:								
Hard					15, 058	$1, 333		
King							1, 247, 000	11, 489
Soft					148	55		
Squid							1, 233, 326	32, 882
Turtles:								
Loggerhead							800	24
Snapper							1, 800	27
Total	6, 463, 614	196, 728	334, 927	30, 835	15, 206	1, 388	26, 612, 193	924, 487

Species	Weirs		Stop nets		Fyke nets		Dip nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			4, 284	$690	1, 413, 000	$14, 150		
Carp			71, 889	9, 716				
Catfish and bullheads			1, 190	111	23, 617	1, 848		
Croaker	1, 560	$60						
Eels					41, 312	5, 891		
Flounders	1, 500	105			157, 330	6, 897		
Herring, sea					70, 800	758		
Spot	1, 620	81						
Squeteague or "sea trout," gray	1, 880	94						
Striped bass					1, 350	401		
Suckers			3, 786	490	392	47		
White perch					68, 800	8, 250		
Yellow perch					173, 400	14, 218		
Crabs:								
Hard							23, 000	$1, 419
King	3, 967, 500	15, 903						
Soft							19, 016	7, 318
Turtles, snapper					1, 700	196		
Total	3, 974, 060	16, 243	81, 149	11, 007	1, 951, 701	52, 656	42, 016	8, 737

Fisheries of New Jersey, 1930—Continued

CATCH: BY GEAR—Continued

Species	Cast nets		Drag nets		Otter trawls			
					Fish		Shrimp	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish					1,223	$127		
Butterfish					8,233	755		
Carp	2,222	$400						
Cod					298,843	6,933		
Croaker					650,285	21,770		
Drum:								
Black					120	9		
Red or redfish					258	21		
Eels					25	3		
Flounders					2,276,274	104,312		
Grunts					150	6		
Hake					2,430	47		
King whiting or "kingfish"					5,800	483		
Mackerel					1,800	36		
Menhaden					3,300	17		
Mullet					190	16		
Scup					1,412,081	31,013		
Sea bass					691,991	19,000		
Shad					3	1		
Sharks					800	96		
Skates					800	12		
Spot					2,795	83		
Squeteague or "sea trout," gray					228,991	9,401		
Sturgeon					2,805	1,015		
Tautog					7,507	218		
White perch					4,119	124		
Whiting					9,000	140		
Lobsters					2,200	555		
Shrimp			21,168	$5,292	51,700	2,061	172,658	$7,132
Squid					6,198	137		
Total	2,222	400	21,168	5,292	5,669,921	198,391	172,658	7,132

Species	Pots						Spears	
	Crab		Eel		Lobster			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels			323,234	$32,965	1,050	$84	156,380	$17,883
Sea bass					1,111,333	41,337		
Tautog					18,810	556		
Crabs, hard	148	$6			9,570	698		
Lobsters					1,008,379	229,555		
Total	148	6	323,234	32,965	2,149,142	272,230	156,380	17,883

Species	Dredges							
	Clam		Crab		Oyster		Scallop	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, hard			204,280	$16,851				
Clams:								
Hard, public	100,592	$6,469						
Hard, private	88,590	16,650			3,552	$1,475		
Surf or skimmer	131,670	15,281						
Oysters:								
Market, public, fall					1,812	270		
Market, private, spring					3,445,557	540,516		
Market, private, fall					7,654,070	1,158,462		
Seed, public, spring					18,444,424	2,401,056		
Seed, private, spring					186,200	15,630		
Scallops, sea							164,100	$33,342
Total	320,852	38,400	204,280	16,851	29,735,615	4,117,409	164,100	33,342

Fisheries of New Jersey, 1930—Continued

CATCH: BY GEAR—Continued

Species	Tongs		Rakes		Forks	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:						
Hard, public	814,856	$375,155	575,687	$235,745		
Hard, private	4,672	2,083	54,096	4,850		
Soft, public			135,787	18,581	124,831	$17,205
Mussels	200	2				
Oysters:						
Market, public, spring	36,166	5,414	109	16		
Market, public, fall	112,476	14,709	218	34		
Market, private, spring	200,160	44,892	7,564	1,819		
Market, private, fall	333,180	74,782	18,176	4,533		
Seed, public, spring	138,914	15,378	38,632	4,948		
Seed, public, fall	82,804	9,959				
Seed, private, spring	106,555	13,636	123,738	10,860		
Seed, private, fall	4,000	300				
Total	1,833,983	556,310	954,007	281,386	124,831	17,205

Species	Hoes		Gaffs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs:						
King					1,300	$156
Soft	86,660	$7,800				
Clams:						
Hard, public	6,080	871			64,341	29,858
Soft, public	234,679	32,250			133,331	19,772
Mussels					4,000	280
Oysters:						
Market, public, spring					1,327	241
Market, public, fall					6,720	1,600
Market, private, spring					2,890	725
Market, private, fall					4,570	975
Seed, private, spring					22,850	1,918
Terrapin, diamond-back			215	$414	5,826	6,658
Turtles:						
Loggerhead			105	7		
Snapper			3,930	358		
Total	327,419	40,921	4,250	779	247,155	62,163

OPERATING UNITS: BY COUNTIES

Item	Atlantic	Bergen	Burlington	Camden	Cape May	Cumberland	Gloucester
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	86	3	3		336	2,663	
On boats and shore—							
Regular	292	2	64	2	410	81	1
Casual	160	20	74	9	260	172	51
Total	538	25	141	11	1,006	2,916	52
Vessels:							
Motor—							
5 to 10 tons	2				32	36	
11 to 20 tons	14	1	1		17	92	
21 to 30 tons	2				3	23	
31 to 40 tons					2	8	
41 to 50 tons					1	4	
51 to 60 tons					1	4	
61 to 70 tons					1	1	
71 to 80 tons					1	1	
Total	18	1	1		58	169	
Net tonnage	250	15	11		846	3,033	
Sail—							
5 to 10 tons						18	
11 to 20 tons						20	
21 to 30 tons						15	
31 to 40 tons						8	
41 to 50 tons						5	
51 to 60 tons						4	

Fisheries of New Jersey, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Atlantic	Bergen	Burlington	Camden	Cape May	Cumberland	Gloucester
Vessels—Continued.							
Sail—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
61 to 70 tons						5	
71 to 80 tons						1	
91 to 100 tons						1	
Total						77	
Net tonnage						2, 085	
Total vessels	18	1	1		58	246	
Total net tonnage	250	15	11		846	5, 118	
Boats:							
Motor	224	7	87		324	103	8
Other	184		34	4	156	77	20
Accessory boats	28	10			45	11	
Apparatus:							
Purse seines—							
Menhaden					1		
Length, yards					456		
Other	4				11		
Length, yards	1, 600				4, 280		
Haul seines	22		19	4	14	12	3
Length, yards	1, 818		1, 980	445	853	1, 410	245
Gill nets—							
Anchor			1				
Square yards			840				
Drift	214		21		472	100	16
Square yards	47, 720		23, 195		211, 148	88, 500	13, 530
Runaround						4	
Square yards						4, 400	
Stake	64	7	6		6	60	
Square yards	3, 072	16, 360	198		600	7, 672	
Lines—							
Hand	39				177	44	
Hooks	70				335	80	
Trawl	178				344	14	
Hooks	114, 200				228, 200	9, 650	
Troll	17				283	4	
Hooks	17				295	4	
Trot, with baits or snoods						3	
Baits or snoods						775	
Pound nets	2				93		
Weirs					65	18	
Stop nets			7	1		19	8
Square yards			5, 550	45		15, 800	2, 500
Fyke nets	4		106		96	185	130
Dip nets	13				6	2	
Cast nets							4
Otter trawls—							
Fish	19				42		
Yards at mouth	471				860		
Shrimp					3		
Yards at mouth					72		
Pots—							
Crab					4		
Eel	12	315			81	20	
Lobster					508		
Spears	9				1		
Dredges—							
Clam					6	28	
Yards at mouth					4	36	
Crab		10					
Yards at mouth		8					
Oyster	4		6			496	
Yards at mouth	4		6			594	
Scallop						4	
Yards at mouth						16	
Tongs	325		83		134	101	
Rakes	273		63		121		
Hoes	14						
Gaffs					3	8	6

Fisheries of New Jersey, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Hudson	Hunterdon	Mercer	Middlesex	Monmouth	Ocean	Salem	Union
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				3	48	150		
On boats and shore—								
Regular	2			6	551	304	32	
Casual		28	21	7	90	211	73	1
Total	2	28	21	16	689	665	105	1
Vessels:								
Motor—								
5 to 10 tons				2	8	26		
11 to 20 tons					3			
Total				2	11	26		
Net tonnage				13	102	164		
Boats:								
Motor	2		1	7	254	325	36	1
Other		9	3	1	150	81	31	
Accessory boats	1			3	13	10		
Apparatus:								
Haul seines		7	5			8	8	
Length, yards		1, 225	950			2, 162	810	
Gill nets—								
Anchor					4			
Square yards					5, 100			
Drift					3		36	
Square yards					47, 800		226, 937	
Runaround				4	42	40		
Square yards				9, 910	129, 564	261, 800		
Stake				2		1, 195		
Square yards				720		133, 201		
Lines—								
Hand					210	80	1	4
Hooks					216	86	2	4
Trawl					135	153		
Hooks					74, 400	77, 000		
Trot, with baits or snoods							1	
Baits or snoods							1, 000	
Pound nets					48	38		
Stop nets							25	
Square yards							10, 809	
Fyke nets			25		51	876	299	
Dip nets					9	5	1	
Drag nets						6		
Yards at mouth						17		
Pots—								
Eel	200			144	2, 727	1, 800		
Lobster				100	21, 112	12, 200		
Spears					35	15		
Dredges—								
Clam				6	16			
Yards at mouth				6	16			
Crab				8	35			
Yards at mouth				8	43			
Oyster						31		
Yards at mouth						30		
Scallop					5			
Yards at mouth					13			
Tongs					19	206		
Rakes					49	161		
Forks					19			
Hoes					56	4		
Gaffs							15	

Fisheries of New Jersey, 1930—Continued

CATCH: BY COUNTIES

Species	Atlantic		Bergen		Burlington		Camden		Cape May	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Albacore									50	$3
Alewives					2,454	$62	96	$5	4,000	200
Bluefish	114,247	$16,223							780,985	68,270
Bonito									20,480	1,464
Butterfish	28,940	2,175							942,307	59,040
Carp					1,947	290	7,400	565		
Catfish and bullheads					1,470	277	565	58		
Cero									20,000	2,000
Cod	2,380,381	61,848							3,091,981	87,208
Croaker	107,475	2,662							1,021,530	35,937
Dolphin									207	11
Drum:										
Black									6,904	135
Red or redfish									64,924	11,656
Eels	55,333	5,055	21,500	$975	2,540	279			41,912	5,510
Flounders	1,162,650	44,765							1,278,237	70,887
Goosefish									24,564	984
Grunts									150	6
Hake									5,315	91
Herring, sea	20,000	215							31,099	310
King whiting or "kingfish"	4,560	422							40,258	4,213
Mackerel	176,600	5,658							193,914	8,545
Menhaden									4,833,023	29,353
Minnows	16,000	200			2,000	20				
Mullet									340	22
Mummichog	16,000	200								
Pilotfish	300	12							1,360	55
Pollock									200	6
Scup or porgy	500,000	9,900							5,597,253	123,965
Sea bass	703,500	14,605							1,126,343	47,814
Sea robin									10,000	100
Shad	1,050	230	41,500	5,684	4,865	983	2,421	592	7,606	1,035
Sharks	500	20							64,906	1,322
Skates	4,450	108							90,808	2,501
Snapper, red									4,000	400
Spanish mackerel									15,801	1,486
Spot	9,050	362							215,679	9,195
Squeteague or "sea trout," gray	431,200	17,432							5,689,205	179,435
Striped bass	5,641	1,107			1,203	602			16	4
Sturgeon									2,805	1,015
Suckers					19,463	2,456	30	3		
Tautog									58,416	2,224
Thimble-eyed mackerel									21,467	625
Tuna or "horse mackerel"									14,792	573
White perch	33,087	3,630			3,100	620			4,269	136
Whiting	10,800	108							90,032	982
Crabs:										
Hard	2,600	230	25,000	2,250					18,616	975
King									4,641,800	26,892
Soft	86,660	7,800								
Lobsters									2,200	555
Shrimp									224,358	9,193
Squid	880	44							388,658	11,451
Clams:										
Hard, public	501,438	232,673			143,600	64,300			207,471	107,136
Hard, private	6,208	2,788							80	20
Surf or skimmer									131,670	15,281
Mussels									4,200	282
Oysters:										
Market, public, spring	4,057	965							5,111	1,043
Market, public, fall	8,305	2,085							9,038	2,194
Market, private, spring	164,958	38,781			76,496	15,795			3,310	825
Market, private, fall	257,092	60,666			151,583	31,187			7,090	1,575
Seed, public, spring	21,942	2,768			8,400	2,350			16,800	1,260
Seed, private, spring	136,793	16,771			182,700	15,225			24,850	2,198
Terrapin, diamond-back									333	599
Turtles, snapper									1,300	156
Total	6,972,697	552,508	88,000	8,909	601,821	134,446	10,512	1,223	31,104,023	940,353

Fisheries of New Jersey, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Cumberland		Gloucester		Hudson		Hunterdon		Mercer	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	3,500	$89	9,252	$1,071	------	------	------	------	8,500	$55
Bluefish	18,518	1,848	------	------	------	------	------	------	------	------
Butterfish	300	21	------	------	------	------	------	------	------	------
Carp	32,220	4,728	7,703	1,217	------	------	300	$36	4,000	480
Catfish and bullheads	10,100	969	2,667	282	------	------	50	5	------	------
Cod	8,460	480	------	------	------	------	------	------	------	------
Croaker	62,486	1,963	------	------	------	------	------	------	------	------
Eels	5,880	551	540	68	20,000	$2,000	------	------	600	60
Flounders	75	8	------	------	------	------	------	------	------	------
King whiting or "kingfish"	50	3	------	------	------	------	------	------	------	------
Scup or porgy	2,550	65	------	------	------	------	------	------	------	------
Shad	42,982	7,817	2,238	437	------	------	3,035	1,049	5,013	2,115
Spot	66,950	3,142	------	------	------	------	------	------	------	------
Squeteague or "sea trout," gray	92,769	4,050	------	------	------	------	------	------	------	------
Striped bass	19,070	1,255	------	------	------	------	------	------	------	------
Sturgeon	------	------	------	------	------	------	------	------	128	51
Suckers	340	51	142	15	------	------	3,100	230	4,500	72
Tautog	12,000	480	------	------	------	------	------	------	------	------
White perch	3,850	330	------	------	------	------	------	------	------	------
Crabs:										
Hard	13,086	1,198	------	------	------	------	------	------	------	------
King	574,000	656	------	------	------	------	------	------	------	------
Clams:										
Hard, public	79,632	3,410	------	------	------	------	------	------	------	------
Hard, private	88,590	16,650	------	------	------	------	------	------	------	------
Oysters:										
Market, public, spring	28,434	3,663	------	------	------	------	------	------	------	------
Market, public, fall	103,883	12,334	------	------	------	------	------	------	------	------
Market, private, spring	3,214,855	486,529	------	------	------	------	------	------	------	------
Market, private, fall	7,408,143	1,103,705	------	------	------	------	------	------	------	------
Seed, public, spring	18,574,828	2,415,004	------	------	------	------	------	------	------	------
Seed, public, fall	82,804	9,959	------	------	------	------	------	------	------	------
Seed, private, spring	8,000	600	------	------	------	------	------	------	------	------
Seed, private, fall	4,000	300	------	------	------	------	------	------	------	------
Scallops, sea	58,500	9,800	------	------	------	------	------	------	------	------
Terrapin, diamond-back	5,708	6,453	------	------	------	------	------	------	------	------
Turtles:										
Loggerhead	105	7	------	------	------	------	------	------	------	------
Snapper	780	72	500	50	------	------	------	------	------	------
Total	30,627,448	4,098,190	23,042	3,140	20,000	2,000	6,485	1,320	22,741	2,833

Species	Middlesex		Monmouth		Ocean		Salem		Union	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Albacore	------	------	27,464	$452	3,600	$54	------	------	------	------
Alewives	------	------	------	------	1,435,800	14,418	520	$28	------	------
Bluefish	13,278	$1,245	1,777,021	201,567	256,095	23,333	------	------	1,600	$176
Bonito	------	------	147,242	7,789	61,724	3,852	------	------	800	56
Butterfish	20	2	732,479	57,986	689,775	59,385	------	------	------	------
Carp	------	------	------	------	------	------	46,862	5,830	------	------
Catfish and bullheads	------	------	------	------	14,110	750	7,385	620	------	------
Cod	------	------	1,148,238	45,104	1,150,311	41,029	------	------	------	------
Croaker	------	------	44,286	1,744	202,830	8,115	1,200	72	------	------
Cusk	------	------	1,900	19	6,500	65	------	------	------	------
Dolphin	------	------	800	16	125	13	------	------	------	------
Eels	2,950	295	238,638	28,824	148,161	14,767	1,695	224	------	------
Flounders	8	1	240,384	18,813	244,998	13,376	------	------	------	------
Goosefish	------	------	13,328	134	------	------	------	------	------	------
Grayfish	------	------	11,440	229	------	------	------	------	------	------
Haddock	------	------	5,797	205	------	------	------	------	------	------
Hagfish	------	------	------	------	7,200	72	------	------	------	------
Hake	------	------	141,766	2,790	75,666	1,121	------	------	------	------
Herring, sea	14	1	414,250	4,141	194,484	1,997	------	------	------	------
King whiting or "kingfish"	------	------	7,411	1,007	16,944	1,893	------	------	------	------
Mackerel	------	------	267,981	10,100	17,233	1,139	------	------	------	------
Menhaden	8,100	55	890,196	9,872	186,691	2,070	------	------	------	------

Fisheries of New Jersey, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Middlesex		Monmouth		Ocean		Salem		Union	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Pilotfish			800	$56						
Pollock			60	1	2,704	$104				
Scup or porgy			552,843	20,163	911,395	29,173				
Sea bass			456,323	24,758	1,259,983	47,183				
Sea robin			68,125	1,425	39,622	421				
Shad			16,405	2,727	8,926	1,228	87,673	$7,230		
Sharks			52,957	1,773	58,106	680				
Skates			82,517	1,124	63,316	647				
Spanish mackerel			28	8	10	2				
Spot	343	$15	149,264	6,485	101,330	3,446				
Squeteague or "sea trout," gray	18,838	922	1,919,697	75,829	2,945,433	80,139	550	37		
Striped bass			5,089	967	5,843	1,826				
Sturgeon			280	200			995	521		
Tautog			67,318	1,899	44,232	1,512				
Thimble-eyed mackerel			13,962	478	293	12				
Tuna or "horse mackerel"			6,370	574	16,400	1,326				
White perch					105,050	12,510				
Whiting			2,833,775	48,782	829,335	9,696				
Yellow perch					179,210	14,633				
Crabs:										
Hard	9,332	700	180,758	14,754			2,664	200		
Soft			12,368	4,375	6,600	2,925	196	73		
Lobsters	1,275	370	953,598	211,635	53,506	17,550				
Shrimp					21,168	5,292				
Squid			229,470	4,590	620,516	16,934				
Clams:										
Hard, public	7,104	1,420	107,097	15,907	515,214	223,252				
Hard, private			53,536	4,600	2,496	1,000				
Soft, public			628,184	87,722	444	86				
Oysters:										
Market, private, spring			6,712	1,235	189,840	44,787				
Market, private, fall					186,088	41,619				
Seed, private, spring					87,000	7,250				
Scallops, sea			105,600	23,542						
Turtles:										
Loggerhead			800	24						
Snapper			1,800	27			3,050	276		
Total	61,262	5,026	14,616,357	946,452	12,966,307	752,682	152,790	25,111	2,400	$232

Industries related to the fisheries of New Jersey, 1930

TRANSPORTING

Item	Atlantic County	Cape May County	Cumberland County	Monmouth County	Ocean County	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Persons engaged:						
On vessels	5		26	2	2	35
On boats			117			117
Total	5		143	2	2	152
Vessels, motor:						
5 to 10 tons	2		2		1	5
11 to 20 tons			1	1		2
21 to 30 tons			2			2
41 to 50 tons			1			1
Total	2		6	1	1	10
Net tonnage	13		127	13	6	159
Boats		1	175			176

Industries related to the fisheries of New Jersey, 1930—Continued

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Atlantic and Burlington Counties	Bergen and Hudson Counties	Camden and Gloucester Counties	Cape May County
Establishments	15	7	4	22
Persons engaged:				
Proprietors	21	5	5	26
Salaried employees	5	9	5	17
Wage earners—				
Average for season	36	63	89	104
Average for year	26	53	68	62
Paid to salaried employees	$20, 260	$22, 940	$16, 300	$52, 230
Paid to wage earners	35, 500	69, 157	75, 747	76, 498
Total salaries and wages	55, 760	92, 097	92, 047	128, 728

Item	Cumberland County	Essex and Passaic Counties	Monmouth County	Ocean County	Total
Establishments	30	14	15	17	124
Persons engaged:					
Proprietors	54	17	18	19	165
Salaried employees	60	31	6	8	141
Wage earners—					
Average for season	734	361	101	48	1, 536
Average for year	298	351	43	28	929
Paid to salaried employees	$82, 587	$113, 145	$10, 778	$27, 020	$345, 260
Paid to wage earners	175, 882	345, 994	73, 015	45, 521	897, 314
Total salaries and wages	258, 469	459, 139	83, 793	72, 541	1, 242, 574

PRODUCTS MANUFACTURED

Item	Quantity	Value
King crabs, dry scrap...tons	458	$17, 857
Clams, soft, fresh-shucked...gallons	35, 064	51, 766
Marine-shell products:		
Buttons...gross	907, 015	1, 149, 840
Novelties	(1)	343, 244
Oysters:		
Fresh-shucked...gallons	439, 824	952, 651
Shell products—		
Poultry feed...tons	7, 008	72, 267
Lime...do	1, 618	8, 158
Miscellaneous [2]	(1)	1, 053, 477
Total		3, 649, 260

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 49]

Item	Quantity	Value
Eels, smoked...pounds	19, 617	$7, 847
Scallops, sea, fresh-shucked...gallons	18, 000	33, 000
Total		40, 847

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[1] Data not available.

[2] Includes cod and flounder fillets; spiced carp; smoked butterfish, carp, chub, cisco, eels, herring, mackerel, salmon, salmon trout, shad, domestic and Russian sturgeon, lake trout, tullibee, whitefish, and kippered herring; canned hard-clam chowder; king crab meal; menhaden products; and buttons from fresh-water mussels.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons employed on transporting craft, 119 have also been included as fishermen, and among the total persons engaged in the preparation of fishermen's manufactured products, 49 have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

PENNSYLVANIA

Fisheries of Pennsylvania, 1930

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets, drift	Lines, hand	Fyke nets	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*
Fishermen, on boats and shore, casual	37	19	1	1	52
Boats:					
Motor		5			5
Other	10	5	1	1	14
Apparatus:					
Number	11	11	1	30	
Length, yards	1, 380				
Square yards		15, 690			
Hooks, baits, or snoods			1		

CATCH: BY GEAR

Species	Haul seines		Gill nets, drift		Lines, hand		Fyke nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives			2, 000	$100				
Carp	893	$97						
Catfish and bullheads	125	13					1, 300	$150
Eels					865	$200		
Shad	2, 112	842	2, 743	622				
Sturgeon	182	182						
Suckers	6, 525	597						
Total	9, 837	1, 731	4, 743	722	865	200	1, 300	150

OPERATING UNITS: BY COUNTIES

Item	Bucks	Delaware	Philadelphia
	Number	*Number*	*Number*
Fishermen on boats and shore, casual	41	9	2
Boats:			
Motor		4	1
Other	12	1	1
Apparatus:			
Haul seines	11		
Length, yards	1, 380		
Gill nets, drift	5	5	1
Square yards	4, 110	10, 530	1, 050
Lines, hand			1
Hooks			1
Fyke nets		30	

Fisheries of Pennsylvania, 1930—Continued

CATCH: By counties

Species	Bucks		Delaware		Philadelphia	
	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	--------	--------	2,000	$100	--------	--------
Carp	893	$97	--------	--------	--------	--------
Catfish and bullheads	125	13	1,300	150	--------	--------
Eels	--------	--------	--------	--------	865	$200
Shad	2,720	1,053	2,015	363	120	48
Sturgeon	182	182	--------	--------	--------	--------
Suckers	6,525	597	--------	--------	--------	--------
Total	10,445	1,942	5,315	613	985	248

Industries related to the fisheries of Pennsylvania

WHOLESALE AND MANUFACTURING

Operating Units, Salaries, and Wages

Item	Berks, Delaware, and Lehigh Counties	Philadelphia County	Total
Establishments	3	53	56
Persons engaged:			
Proprietors	5	81	86
Salaried employees	8	116	124
Wage earners—			
Average for season	52	488	540
Average for year	48	405	453
Paid to salaried employees	$34,734	$520,193	$554,927
Paid to wage earners	36,873	571,478	608,351
Total salaries and wages	71,607	1,091,671	1,163,278

Products Manufactured

Item	Quantity	Value
Herring, sea, smoked .... pounds	112,000	$9,240
Mackerel, smoked .... do	7,600	1,600
Shad, smoked .... do	87,375	20,644
Whitefish, smoked .... do	35,000	11,750
Hard clams, fresh-shucked .... gallons	9,234	23,044
Oysters:		
Fresh-shucked .... do	103,605	268,097
Shell products—		
Poultry feed .... tons	5,738	61,091
Lime .... do	1,752	8,629
Miscellaneous [1]	[2]	1,623,110
Total	--------	2,027,205

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[1] Includes spiced alewives and herring; smoked alewives, butterfish, carp, chub, ciscoes, cod fillets, haddock fillets, herring bloaters, kippered herring, Nova Scotia herring, salmon, kippered salmon, sturgeon, lake trout, tullibee from Canada, Russian sturgeon, and finnan haddie; fish scrap; marine-shell products; and fresh-water mussel-shell products.

[2] Data not available.

DELAWARE

Fisheries of Delaware, 1930

OPERATING UNITS: BY GEAR

Item	Purse seines, menhaden	Haul seines	Gill nets			Lines		
			Drift	Run-around	Stake	Hand	Trawl	Trot, with baits or snoods
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	570							
On boats and shore—								
Regular		124	37	42	31	31	8	
Casual		229	71	31	40	11	2	1
Total	570	353	108	73	71	42	10	1
Vessels:								
Steam—								
41 to 50 tons	1							
81 to 90 tons	1							
101 to 110 tons	3							
111 to 120 tons	1							
121 to 130 tons	1							
161 to 170 tons	2							
171 to 180 tons	4							
181 to 190 tons	1							
Total	14							
Net tonnage	1,904							
Motor—								
61 to 70 tons	1							
101 to 110 tons	1							
Total	2							
Net tonnage	172							
Total vessels	16							
Total net tonnage	2,076							
Boats:								
Motor		1	39	12	7	13	4	
Other		93	14	22	27	5	1	1
Accessory boats	51	6	3	1	4			
Apparatus:								
Number	16	87	79	45	209	52	14	1
Length, yards	6,528	23,970						
Square yards			211,379	40,000	23,424			
Hooks, baits, or snoods						104	6,100	50

Item	Pound nets	Stop nets	Fyke nets	Dip nets	Cast nets	Pots		Spears
						Eel	Lobster	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On boats and shore—								
Regular	16	2	22	20		18	11	
Casual	25	12	27	16	7	16	2	6
Total	41	14	49	36	7	34	13	6
Boats:								
Motor			3	1		6	4	2
Other	15	9	15	21	4	17		3
Accessory boats	2		2			2		
Apparatus:								
Number	67	9	320	36	7	775	185	6
Square yards		3,368						

Fisheries of Delaware, 1930—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Dredges		Tongs	Rakes	Gaffs	By hand	Total, exclusive of duplication
	Clam	Oyster					
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	30	90					666
On boats and shore—							
Regular			67	5			197
Casual			13		1	10	374
Total	30	90	80	5	1	10	1, 237
Vessels:							
Steam—							
41 to 50 tons							1
81 to 90 tons							1
101 to 110 tons							3
111 to 120 tons							1
121 to 130 tons							1
161 to 170 tons							2
171 to 180 tons							4
181 to 190 tons							1
Total							14
Net tonnage							1, 904
Motor—							
5 to 10 tons	1	2					2
11 to 20 tons	1	2					2
21 to 30 tons	2	2					3
61 to 70 tons							1
101 to 110 tons							1
Total	4	6					9
Net tonnage	66	95					289
Sail—							
5 to 10 tons		3					3
11 to 20 tons	1	7					7
Total	1	10					10
Net tonnage	14	133					133
Total vessels	5	16					33
Total net tonnage	80	228					2, 326
Boats:							
Motor			2	3			68
Other			70				192
Accessory boats			18	1			86
Apparatus:							
Number	10	32	80	6	1	10	
Yards at mouth	10	39					

CATCH: BY GEAR

Species	Purse seines, menhaden		Haul seines		Gill nets			
					Drift		Runaround	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			3, 039, 201	$6, 188	30, 533	$389		
Bluefish			3, 750	371	17, 500	1, 114		
Carp			56, 184	5, 017	2, 000	240		
Catfish and bullheads			24, 295	2, 250				
Croaker			398, 350	9, 992	449, 800	9, 200	163, 880	$5, 324
Eels			4, 282	510				
Flounders			28, 950	1, 998				
Gizzard shad			950	7				
King whiting or "kingfish"			3, 080	119				
Menhaden	41, 960, 142	$307, 112						
Mullet			1, 800	130			63, 000	4, 170
Shad			1, 016	168	46, 229	9, 424		
Spot			3, 960	101	122, 500	6, 526	51	3
Squeteagues or "sea trout," gray			713, 350	25, 892	315, 000	6, 817	87, 800	2, 681
Striped bass			25, 250	5, 585	13, 500	3, 645		
Sturgeon					15, 313	6, 253		
White perch			96, 775	15, 148	19, 900	3, 936		
Yellow perch			32, 035	3, 155				
Yellowtail			2, 940	84				
Total	41, 960, 142	307, 112	4, 436, 168	76, 715	1, 032, 275	47, 544	314, 731	12, 178

Fisheries of Delaware, 1930—Continued

CATCH: BY GEAR—Continued

Species	Gill nets—Con.		Lines					
	Stake		Hand		Trawl		Trot, with baits or snoods	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	88,926	$2,268						
Bluefish	4,900	343	4,860	$486				
Carp	14,000	2,040						
Catfish and bullheads	931	126						
Cod					97,144	$3,600		
Croaker			112,900	4,188				
Eels							2,605	$443
Flounders	68,550	4,897						
Scup			27,000	2,160				
Sea bass			20,250	1,620				
Shad	7,201	1,282						
Spot			20,250	1,620				
Squeteagues or "sea trout," gray	41,900	490	75,975	4,518				
Striped bass	57,494	12,090						
Suckers	150	9						
Tautog			74,000	2,300				
White perch	55,030	9,411						
Total	339,082	32,956	335,235	16,892	97,144	3,600	2,605	443

Species	Pound nets		Stop nets		Fyke nets		Dip nets		Cast nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	34,706	$891			600	$6				
Carp	1,688	212	4,659	$674	630	38			5,175	$734
Catfish and bullheads	7,333	775	775	72	3,273	279			1,310	145
Eels	2,818	393			44,387	5,158				
Flounders	7,393	525			27,660	2,083				
Squeteagues or "sea trout," gray	400	40			300	30				
Striped bass	1,453	351			4,330	778				
White perch	6,234	799			32,032	5,821				
Yellow perch	2,350	229	330	26	13,045	1,279				
Crabs:										
King	762,500	990								
Soft							23,800	$4,850		
Turtles, snapper					2,550	133				
Total	826,875	5,205	5,764	772	128,807	15,605	23,800	4,850	6,485	879

Species	Pots				Spears		Dredges			
	Eel		Lobster				Clam		Oyster	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp					1,500	$90				
Catfish and bullheads					1,000	114				
Eels	38,499	$4,354			998	138				
Lobsters			11,750	$2,620						
Clams:										
Hard, public							6,903	$2,020		
Hard, private							6,003	2,001		
Oysters:										
Market, private, spring							28,120	3,967		
Market, private, fall							29,712	4,171	201,926	$27,618
Seed, public, spring							38,250	2,550	549,000	39,600
Total	38,499	4,354	11,750	2,620	3,498	342	108,988	14,709	750,926	67,218

Fisheries of Delaware, 1930—Continued

CATCH: BY GEAR—Continued

Species	Tongs		Rakes		Gaffs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, king							206, 260	$275
Clams, hard, public	9, 600	$1, 020	2, 000	$750				
Mussels	19, 500	1, 875						
Oysters:								
Market, public, fall	166, 467	18, 942						
Market, private, fall	1, 875	213						
Seed, public, spring	176, 850	11, 220						
Seed, public, fall	75, 374	4, 501						
Turtles, snapper					100	$5		
Total	449, 666	37, 771	2, 000	750	100	5	206, 260	275

OPERATING UNITS: BY COUNTIES

Item	Kent	New Castle	Sussex
Fishermen:	*Number*	*Number*	*Number*
On vessels	90		576
On boats and shore—			
Regular	118	1	78
Casual	49	71	254
Total	257	72	908
Vessels:			
Steam—			
41 to 50 tons			1
81 to 90 tons			1
101 to 110 tons			3
111 to 120 tons			1
121 to 130 tons			1
161 to 170 tons			2
171 to 180 tons			4
181 to 190 tons			1
Total			14
Net tonnage			1, 904
Motor—			
5 to 10 tons	2		
11 to 20 tons	2		
21 to 30 tons	2		1
61 to 70 tons			1
101 to 110 tons			1
Total	6		3
Net tonnage	93		196
Sail—			
5 to 10 tons	3		
11 to 20 tons	7		
Total	10		
Net tonnage	133		
Total vessels	16		17
Total net tonnage	226		2, 100
Boats:			
Motor	17	16	35
Other	80	26	86
Accessory boats	21	4	61
Apparatus:			
Purse seines, menhaden			16
Length, yards			6, 528
Haul seines	24	15	48
Length, yards	8, 010	1, 530	14, 430
Gill nets—			
Drift	11	29	39
Square yards	35, 000	133, 889	42, 490
Runaround	4		41
Square yards	14, 000		26, 000
Stake	46	7	156
Square yards	9, 490	2, 800	11, 134

Fisheries of Delaware, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Kent	New Castle	Sussex
Apparatus—Continued.			
Lines—	*Number*	*Number*	*Number*
Hand	20	----------	32
Hooks	40	----------	64
Trawl	6	----------	8
Hooks	3, 100	----------	3, 000
Trot, with baits or snoods	----------	1	----------
Baits or snoods	----------	50	----------
Pounds nets	23	15	29
Stop nets	2	7	----------
Square yards	3, 200	168	----------
Fyke nets	45	58	217
Dip nets	----------	----------	36
Cast nets	3	4	----------
Pots—			
Eel	127	----------	648
Lobster	----------	----------	185
Spears	----------	----------	6
Dredges—			
Clam	10	----------	----------
Yards at mouth	10	----------	----------
Oyster	30	----------	2
Yards at mouth	37	----------	2
Tongs	69	----------	11
Rakes	6	----------	----------
Gaffs	----------	1	----------
By hand	10	----------	----------

CATCH: BY COUNTIES

Species	Kent		New Castle		Sussex	
	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	1, 700	$34	----------	----------	3, 192, 266	$9, 708
Bluefish	----------	----------	----------	----------	31, 010	2, 314
Carp	3, 859	596	45, 809	$6, 375	36, 168	2, 074
Catfish and bullheads	3, 319	410	17, 664	1, 722	17, 934	1, 629
Cod	24, 144	590	----------	----------	73, 000	3, 010
Croaker	190, 250	5, 798	750	84	933, 930	22, 822
Eels	10, 367	1, 064	12, 506	1, 500	70, 716	8, 432
Flounders	----------	----------	----------	----------	132, 553	9, 503
Gizzard shad	----------	----------	950	7	----------	----------
King whiting or "kingfish"	1, 400	70	----------	----------	1, 680	49
Menhaden	----------	----------	----------	----------	41, 960, 142	307, 112
Mullet	1, 000	50	----------	----------	63, 800	4, 250
Scup	----------	----------	----------	----------	27, 000	2, 160
Sea bass	----------	----------	----------	----------	20, 250	1, 620
Shad	7, 201	1, 282	36, 479	7, 774	10, 766	1, 818
Spot	----------	----------	----------	----------	146, 761	8, 250
Squeteague or "sea trout," gray	363, 025	18, 198	750	84	870, 950	22, 186
Striped bass	37, 200	8, 750	520	94	64, 307	13, 605
Sturgeon	----------	----------	15, 313	6, 253	----------	----------
Suckers	150	9	----------	----------	----------	----------
Tautog	----------	----------	----------	----------	74, 000	2, 300
White perch	51, 825	6, 853	2, 825	294	155, 321	27, 968
Yellow perch	100	9	3, 915	361	43, 745	4, 319
Yellowtail	----------	----------	----------	----------	2, 940	84
Crabs:						
King	968, 760	1, 265	----------	----------	----------	----------
Soft	----------	----------	----------	----------	23, 800	4, 850
Lobsters	----------	----------	----------	----------	11, 750	2, 620
Clams:						
Hard, public	18, 503	3, 790	----------	----------	----------	----------
Hard, private	6, 003	2, 001	----------	----------	----------	----------
Mussels	19, 500	1, 875	----------	----------	----------	----------
Oysters:						
Market, public, fall	86, 675	8, 068	----------	----------	79, 792	10, 874
Market, private, spring	28, 120	3, 967	----------	----------	----------	----------
Market, private, fall	210, 263	29, 002	----------	----------	23, 250	3, 000
Seed, public, spring	753, 300	52, 650	----------	----------	10, 800	720
Seed, public, fall	64, 800	3, 795	----------	----------	10, 574	706
Turtles, snapper	2, 550	133	100	5	----------	----------
Total	2, 854, 014	150, 259	137, 581	24, 553	48, 089, 205	477, 983

Industries related to the fisheries of Delaware, 1930

TRANSPORTING IN KENT COUNTY

Persons engaged on vessels	5
Vessels, motor	1
Net tonnage	9

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Kent County	New Castle County	Sussex County	Total
Establishments	4	5	9	18
Persons engaged:				
Proprietors	8	5	10	23
Salaried employees	4	3	15	22
Wage earners—				
Average for season	34	16	283	333
Average for year	18	9	103	130
Paid to salaried employees	$7,752	$6,500	$28,840	$43,092
Paid to wage earners	15,047	10,682	61,365	87,094
Total, salaries and wages	22,799	17,182	90,205	130,186

PRODUCTS MANUFACTURED

Item	Quantity	Value
Oysters, fresh-shucked gallons	78,080	$153,584
Miscellaneous [1]	(2)	603,675
Total		757,259

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 39]

King crabs, dry scrap tons	178	$7,104

[1] Includes shucked hard clams; marine and domestic shell products; canned sturgeon caviar; oyster-shell products; and menhaden products.

[2] Data not available.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons employed on transporting craft, 5 have also been included as fishermen, and among the total persons engaged in the preparation of fishermen's manufactured products, 39 have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

VESSEL FISHERIES AT NEW YORK CITY AND GROTON, CONN.[7]

During 1931 fishing vessels of 5 net tons capacity or greater landed 51,854,000 pounds of fishery products at New York City and Groton, Conn. This is 9 per cent less than during the previous year. The landings consisted of bluefish, 1,788,000 pounds; cod, 5,368,000 pounds; flounders, 8,438,000 pounds; haddock, 28,502,000 pounds; halibut, 47,000 pounds; mackerel, 1,685,000 pounds; scup or porgies and sea bass, 696,000 pounds; tilefish, 2,782,000 pounds; squeteague or weakfish, 37,000 pounds; and miscellaneous species, 2,511,000 pounds.

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[7] Statistics on the landings at New York City are collected by J. H. Matthews, executive secretary, Middle Atlantic Fisheries Association and forwarded to this bureau where they are combined with Groton landings. The statistics for the two ports are combined to avoid disclosure of individual enterprise.

SHAD FISHERY OF THE HUDSON RIVER

The shad fishery of the Hudson River in 1931 was prosecuted by 252 fishermen, who used 25 motor boats, 107 other boats, 104 drift gill nets, having a total area of 315,298 square yards, 19 stake gill nets having a total area of 19,167 square yards, and 2 haul seines having a combined length of 349 yards. The total catch was 125,943 shad, having a weight of 414,611 pounds and a value to the fishermen of $49,781. This is an increase of slightly over 100 per cent in number and 49 per cent in value as compared with 1930. The average price per pound received by the fishermen in 1931 was about 12 cents as compared with 16 cents received in 1930.

About 73 per cent of the catch in number was taken with drift gill nets, 25 per cent with stake gill nets, and 1 per cent with haul seines. The remainder was taken incidentally with gear used mainly for other species of fish.

With the exception of some fishing with stake gill nets from one town in New Jersey, the fishing was prosecuted entirely from points in New York.

Shad fishery of the Hudson River, 1931

Item	New York			New Jersey			Total		
	Number	Pounds	Value	Number	Pounds	Value	Number	Pounds	Value
Fishermen:									
On boats and shore—									
Regular	5	--------	--------	2	--------	--------	7	--------	--------
Casual	224	--------	--------	21	--------	--------	245	--------	--------
Total	229	--------	--------	23	--------	--------	252	--------	--------
Boats:									
Motor	22	--------	--------	3	--------	--------	25	--------	--------
Other	101	--------	--------	6	--------	--------	107	--------	--------
Apparatus:									
Gill nets—									
Drift	104	--------	--------	--------	--------	--------	104	--------	--------
Square yards	315, 298	--------	--------	--------	--------	--------	315, 298	--------	--------
Stake	15	--------	--------	4	--------	--------	19	--------	--------
Square yards	12, 167	--------	--------	7, 000	--------	--------	19, 167	--------	--------
Haul seines	2	--------	--------	--------	--------	--------	2	--------	--------
Length, yards	349	--------	--------	--------	--------	--------	349	--------	--------
Shad caught:									
With drift gill nets	92. 353	303, 563	$36, 546	--------	--------	--------	92, 353	303, 563	$36, 546
With stake gill nets	9, 975	33, 795	3, 587	21, 900	72, 000	$8, 941	31, 875	105, 795	12, 528
With haul seines	1, 270	3, 815	437	--------	--------	--------	1, 270	3, 815	437
Incidentally	445	1, 438	270	--------	--------	--------	445	1, 438	270
Total	104, 043	342, 611	40, 840	21, 900	72, 000	8, 941	125, 943	414, 611	49, 781

FISHERIES OF THE CHESAPEAKE BAY STATES[8]

The yield of fishery products in the Chesapeake Bay States (Maryland and Virginia) during 1930 amounted to 316,392,924 pounds, valued at $11,472,050. This is an increase of 15 per cent in the catch but a decrease of 1 per cent in the value of the catch as compared with the quantity and its value for 1929. Of the total catch in 1930, 199,326,534 pounds, valued at $4,391,493, were fish; and 117,066,390 pounds, valued at $7,080,557, were shellfish and miscellaneous products. These fisheries gave employment to 19,391 fishermen, or 5 per cent more than in 1929. Of the total number of fishermen employed during 1930, 2,579 regular fishermen were engaged on vessels, and 10,635 regular and 6,177 casual fishermen were employed in the shore and boat fisheries.

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[8] With reference to the figures published in this section the reader should refer to that section in the latter part of the book entitled "Statistical survey procedure" which gives in detail methods for collecting statistics, compilation practices, and conversion factors. This is most necessary for a complete understanding of the statistics presented herewith.

Fisheries of the Chesapeake Bay States, 1930

SUMMARY OF CATCH

Product	Maryland		Virginia		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Fish	16, 680, 888	$873, 469	182, 645, 646	$3, 518, 024	199, 326, 534	$4, 391, 493
Shellfish, etc	54, 417, 656	3, 111, 279	62, 648, 734	3, 969, 278	117, 066, 390	7, 080, 557
Total	71, 098, 544	3, 984, 748	245, 294, 380	7, 487, 302	316, 392, 924	11, 472, 050

OPERATING UNITS: BY STATES

Item	Maryland	Virginia	Total
Fishermen:	*Number*	*Number*	*Number*
On vessels	1, 127	1, 452	2, 579
On boats and shore—			
Regular	4, 917	5, 718	10, 635
Casual	2, 483	3, 694	6, 177
Total	8, 527	10, 864	19, 391
Vessels:			
Steam	----	25	25
Net tonnage	----	2, 902	2, 902
Motor	2	85	87
Net tonnage	13	1, 440	1, 453
Sail	252	27	279
Net tonnage	2, 796	219	3, 015
Total vessels	254	137	391
Total net tonnage	2, 809	4, 561	7, 370
Boats:			
Motor	3, 687	4, 530	8, 217
Other	2, 435	3, 168	5, 603
Accessory boats	20	62	82
Apparatus:			
Purse seines—			
Menhaden	----	31	31
Length, yards	----	8, 720	8, 720
Other	18	----	18
Length, yards	5, 012	----	5, 012
Haul seines	188	187	375
Length, yards	34, 784	59, 430	94, 214
Gill nets—			
Anchor	11	1	12
Square yards	2, 845	9, 600	12, 445
Drift	303	652	955
Square yards	447, 800	663, 042	1, 110, 842
Runaround	5	----	5
Square yards	5, 920	----	5, 920
Stake	2, 564	16, 453	19, 017
Square yards	151, 660	607, 190	758, 850
Lines—			
Hand	18	----	18
Hooks	36	----	36
Trot, with baits or snoods	1, 510	1, 386	2, 896
Baits or snoods	977, 035	662, 440	1, 639, 475
Trot, with hooks	22	----	22
Hooks	3, 450	----	3, 450
Pound nets	692	2, 262	2, 954
Stop nets	6	----	6
Square yards	10, 350	----	10, 350
Fyke nets	2, 388	1, 084	3, 472
Dip nets	1, 393	712	2 105

Fisheries of the Chesapeake Bay States, 1930—Continued

OPERATING UNITS: BY STATES—Continued

Item	Maryland	Virginia	Total
Apparatus—Continued.	*Number*	*Number*	*Number*
Cast nets	3		3
Otter trawls		12	12
Yards at mouth		358	358
Pots, eel	12,652	640	13,292
Spears	18		18
Scrapes	1,232	618	1,850
Yards at mouth	1,232	618	1,850
Dredges—			
Crab		102	102
Yards at mouth		182	182
Oyster	710	256	966
Yards at mouth	898	293	1,191
Scallop		924	924
Yards at mouth		617	617
Tongs	4,849	4,820	9,669
Rakes	134	948	1,082
Picks	8	477	485

CATCH: BY STATES

Species	Maryland		Virginia		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Alewives	5,741,307	$86,121	15,387,018	$181,533	21,128,325	$267,654
Black bass	19,179	3,263			19,179	3,263
Bluefish	267,611	26,031	230,006	16,182	497,617	42,213
Bonito	5,200	416	43,615	2,181	48,815	2,597
Butterfish	615,480	37,118	3,675,005	163,675	4,290,485	200,793
Cabio, or crab eater	200	10			200	10
Carp	226,240	22,038	242,750	11,757	468,990	33,795
Catfish and bullheads	398,983	19,500	407,787	15,471	806,770	34,971
Cod			50,103	1,200	50,103	1,200
Croaker	2,113,780	62,271	19,908,201	462,763	22,021,981	525,034
Drum:						
Black	40,000	500	24,370	517	64,370	1,017
Red or redfish	16,000	327	36,200	1,437	52,200	1,764
Eels	314,361	27,115	74,765	6,626	389,126	33,741
Flounders	102,375	5,011	559,564	26,014	661,939	31,025
Gizzard shad	31,999	764	135,750	3,234	167,749	3,998
Goldfish or "sand perch"	12,665	621			12,665	621
Hake			1,422	42	1,422	42
Harvestfish			400	20	400	20
Hickory shad	6,550	229	83,900	2,828	90,450	3,057
King whiting or "kingfish"	1,600	128	2,989	144	4,589	272
Mackerel	800	48	47,874	4,747	48,674	4,795
Menhaden			115,841,600	767,210	115,841,600	767,210
Mullet	22,150	1,181	93,000	3,910	115,150	5,091
Pigfish	400	20	68,700	3,444	69,100	3,464
Pike or pickerel	10,918	2,019	80	20	10,998	2,039
Pompano	100	25	2,000	400	2,100	425
Scup	60,000	2,400	403,514	20,461	463,514	22,861
Sea bass	20,200	1,212	191,573	14,479	211,773	15,691
Sea robin	600	6			600	6
Shad	998,436	149,742	6,183,009	989,125	7,181,445	1,138,867
Skates	800	8	1,800	27	2,600	35
Spanish mackerel	8,200	1,010	50,150	6,480	58,350	7,490
Spot	126,295	6,569	2,492,935	124,874	2,619,230	131,443
Squeteagues or "sea trout":						
Gray	3,753,647	172,258	15,512,389	580,708	19,266,036	752,966
Spotted	3,580	423	198,000	23,769	201,580	24,192
Striped bass	1,227,990	203,569	425,175	67,076	1,653,165	270,645
Sturgeon			4,590	1,380	4,590	1,380
Tautog	200	10	800	32	1,000	42
Tomcod	280	8			280	8
White perch	420,246	31,738	196,245	9,761	616,491	41,499
Whiting	5,000	200	21,707	897	26,707	1,097
Yellow perch	107,516	9,560	46,660	3,600	154,176	13,160
Total	16,680,888	873,469	182,645,646	3,518,024	199,326,534	4,391,493

Fisheries of the Chesapeake Bay States, 1930—Continued

CATCH: BY STATES—Continued

Species	Maryland		Virginia		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
SHELLFISH, ETC.						
Crabs:						
Hard	31, 625, 767	$529, 005	28, 939, 870	$543, 056	60, 565, 637	$1, 072, 061
Soft	5, 313, 016	455, 166	2, 881, 000	195, 005	8, 194, 016	650, 171
Squid	100, 000	4, 000	125, 383	3, 849	225, 383	7, 849
Clams, hard, public	80, 800	40, 400	1, 212, 736	391, 771	1, 293, 536	432, 171
Oysters: [1]						
Market, public, spring	4, 574, 673	544, 278	1, 581, 175	185, 490	6, 155, 848	729, 768
Market, public, fall	10, 648, 311	1, 272, 071	4, 843, 530	567, 473	15, 491, 841	1, 839, 544
Market, private, spring	489, 125	65, 015	2, 980, 752	346, 317	3, 469, 877	411, 332
Market, private, fall	1, 393, 860	188, 608	10, 212, 420	1, 182, 665	11, 606, 280	1, 371, 273
Seed, public, spring	188, 404	11, 072	2, 509, 715	125, 483	2, 698, 119	136, 555
Seed, public, fall			5, 537, 205	280, 605	5, 537, 205	280, 605
Scallops, bay			1, 824, 948	147, 564	1, 824, 948	147, 564
Turtles, snapper	1, 600	64			1, 600	64
Terrapin, diamond-back	2, 100	1, 600			2, 100	1, 600
Total	54, 417, 656	3, 111, 279	62, 648, 734	3, 969, 278	117, 066, 390	7, 080, 557
Grand total	71, 098, 544	3, 984, 748	245, 294, 380	7, 487, 302	316, 392, 924	11, 472, 050

PRODUCTION OF CERTAIN SHELLFISH IN NUMBERS AND BUSHELS

Product	Maryland		Virginia		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
Crabs:						
Hard......number	94, 877, 301	$529, 005	86, 819, 610	$543, 056	181, 696, 911	$1, 072, 061
Soft......do	15, 939, 048	455, 166	8, 643, 000	195, 005	24, 582, 048	650, 171
Clams, hard......bushels	10, 100	40, 400	151, 592	391, 771	161, 692	432, 171
Oysters:						
Market, public, spring......do	617, 115	544, 278	230, 492	185, 490	847, 607	729, 768
Market, public, fall......do	1, 436, 437	1, 272, 071	706, 054	567, 473	2, 142, 491	1, 839, 544
Market, private, spring......do	65, 982	65, 015	434, 512	346, 317	500, 494	411, 332
Market, private, fall......do	188, 029	188, 608	1, 488, 691	1, 182, 665	1, 676, 720	1, 371, 273
Seed, public, spring......do	37, 681	11, 072	501, 943	125, 483	539, 624	136, 555
Seed, public, fall......do			1, 107, 441	280, 605	1, 107, 441	280, 605
Scallops, bay......do			304, 158	147, 564	304, 158	147, 564

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[1] Statistics on oyster used in this table are based on yields of 7.413 pounds of meats to the bushel for market oysters in Maryland, 6.86 pounds for market oysters in Virginia, and 5 pounds for seed oysters in both States. In reports for previous years all oysters in both States have been computed on the basis of a uniform yield of 7 pounds to the bushel.

Industries related to the fisheries of the Chesapeake Bay States, 1930

Item	Maryland	Virginia	Total
Transporting:	*Number*	*Number*	*Number*
Persons engaged	354	501	855
Vessels—			
Motor	151	253	404
Net tonnage	2, 227	3, 046	5, 273
Sail	23	1	24
Net tonnage	707	30	737
Total vessels	174	254	428
Total net tonnage	2, 934	3, 076	6, 010
Wholesale and manufacturing:			
Establishments	323	220	543
Persons engaged—			
Proprietors	509	303	812
Salaried employees	216	78	294
Wage earners:			
Average for season	6, 121	4, 448	10, 569
Average for year	2, 891	1, 817	4, 708
Salaries and wages paid	$1, 756, 224	$1, 220, 122	$2, 976, 346
Products [1]	$5, 155, 591	$5, 228, 100	$10, 383, 691
Fishermen's manufactured products:			
Persons engaged	52	479	531
Products	$8, 140	$100, 000	$108, 140

[1] These production figures are not comparable with those shown in previous bulletins, since packaged fresh and frozen fishery products are now included.

NOTE.—Of the total number of persons engaged in the preparation of fishermen's manufactured products, 528 have been included as fishermen. This fact should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

MARYLAND

Fisheries of Maryland, 1930

OPERATING UNITS: BY GEAR

Item	Purse seines	Haul seines	Gill nets				Lines			Pound nets	Stop nets
			Anchor	Drift	Runaround	Stake	Hand	Trot, with baits or snood	Trot, with hooks		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:											
On vessels	74										
On boats and shore—											
Regular	46	294	18	74	14	74	18	1, 317	10	510	1
Casual		285	2	374	2	83		160	3	176	10
Total	120	579	20	448	16	157	18	1, 477	13	686	11
Vessels:											
Motor—5 to 10 tons	1										
Net tonnage	7										
Sail—											
5 to 10 tons	1										
11 to 20 tons	2										
21 to 30 tons	6										
31 to 40 tons	1										
Total	10										
Net tonnage	222										
Total vessels	11										
Total net tonnage	229										
Boats:											
Motor	20	90	9	166	5	64	9	1, 233		236	3
Other	1	186	1	95	5	50		208	13	263	4
Accessory boats	20										
Apparatus:											
Number	18	188	11	303	5	2, 564	18	1, 510	22	692	6
Length, yards	5, 012	34, 784									
Square yards			2, 845	447, 800	5, 920	151, 660					10, 350
Hooks, baits, or snoods							36	977, 035	3, 450		

Fisheries of Maryland, 1930—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Fyke nets	Dip nets	Cast nets	Pots, eel	Spears	Scrapes	Dredges, oyster	Tongs	Rakes	Picks	By hand	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:												
On vessels							1,085	3				1,127
On boats and shore—												
Regular	35	991		123	18	640	201	3,345	98		16	4,917
Casual	107	408	3	42		22		1,114	36	8	35	2,483
Total	142	1,399	3	165	18	662	1,286	4,462	134	8	51	8,527
Vessels:												
Motor—5 to 10 tons								1				2
Net tonnage								6				13
Sail—												
5 to 10 tons							194					194
11 to 20 tons							23					24
21 to 30 tons							18					21
31 to 40 tons							6					7
41 to 50 tons							4					4
51 to 60 tons							2					2
Total							247					252
Net tonnage							2,676					2,796
Total vessels							247	1				254
Total net tonnage							2,676	6				2,809
Boats:												
Motor	68	530		138	12		20	2,579	48		5	3,687
Other	60	961	3	6	6	584	88	368	37	8	46	2,435
Accessory boats												20
Apparatus:												
Number	2,388	1,393	3	12,652	18	1,232	710	4,849	134	8		
Yards at mouth						1,232	898					

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets			
					Anchor		Drift	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			101,200	$1,524			46,809	$724
Black bass			11,475	1,880				
Bluefish	88,136	$8,818	31,300	2,830				
Carp			149,593	14,210				
Catfish and bullheads			114,825	5,554				
Croaker	73,218	1,957	620,200	20,982			8,400	252
Eels			1,960	149				
Flounders			9,700	507				
Gizzard shad			2,100	50				
Goldfish or "sand perch"			9,665	491				
Hickory shad							500	20
Mullet			1,300	74	18,000	$916		
Pike or pickerel			2,685	527				
Shad			2,837	397			225,625	33,602
Spot	2,700	177	44,000	2,697				
Squeteagues or "sea trout":								
Gray	170,746	12,220	87,650	5,836			200	20
Spotted			2,400	288				
Striped bass	310,607	47,364	219,903	40,315	1,200	240	170,212	28,533
White perch			107,085	8,149	2,000	200	11,300	885
Yellow perch			15,835	1,431			400	40
Crabs, soft			48,314	5,566				
Total	645,407	70,536	1,584,027	113,457	21,200	1,356	463,446	64,076

Fisheries of Maryland, 1930—Continued

CATCH: BY GEAR—Continued

Species	Gill nets—Continued				Lines			
	Runaround		Stake		Hand		Trot, with baits or snoods	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			18,600	$335				
Bluefish	49,800	$4,784			40,000	$4,000		
Bonito					2,000	160		
Catfish and bullheads			200	10				
Croaker			400	12	5,800	174		
Flounders					6,400	320		
Gizzard shad			684	27				
Mullet			300	24				
Scup or porgy					22,400	896		
Sea bass					20,000	1,200		
Shad			135,211	20,398				
Spanish mackerel	200	50						
Squeteagues or "sea trout," gray			1,500	120	32,000	1,600		
Striped bass	2,500	450	122,000	18,839				
White perch			10,800	820				
Yellow perch			1,200	120				
Crabs, hard							30,315,632	$505,730
Total	52,500	5,284	290,895	40,705	128,600	8,350	30,315,632	505,730

Species	Lines—Contd.		Pound nets		Stop nets		Fyke nets	
	Trot, with hooks							
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			5,574,298	$83,530			400	$8
Black bass			250	46			7,454	1,337
Bluefish			58,375	5,599				
Bonito			3,200	256				
Butterfish			615,480	37,118				
Cabio or crab eater			200	10				
Carp			14,822	1,100	31,800	$3,636	6,025	572
Catfish and bullheads	8,300	$415	137,372	6,625			138,286	6,896
Croaker			1,405,462	38,869			300	25
Drum:								
Black			40,000	500				
Red or redfish			16,000	327				
Eels	1,840	147	19,014	1,561			23,087	2,057
Flounders			86,275	4,184				
Gizzard shad			26,915	633			2,300	54
Goldfish or "sand perch"			400	16			2,600	114
Hickory shad			5,650	193			400	16
King whiting or "kingfish"			1,600	128				
Mackerel			800	48				
Mullet			1,550	88			1,000	79
Pigfish			400	20				
Pike or pickerel			594	117			7,639	1,375
Pompano			100	25				
Scup or porgy			37,600	1,504				
Sea bass			200	12				
Sea robin			600	6				
Shad			634,763	95,345				
Skates			800	8				
Spanish mackerel			8,000	960				
Spot			79,595	3,695				
Squeteagues or "sea trout":								
Gray			3,461,551	152,462				
Spotted			1,180	135				
Striped bass			399,268	67,392			2,300	436
Tautog			200	10				
Tomcod			280	8				
White perch			198,740	15,063			90,321	6,621
Whiting			5,000	200				
Yellow perch			14,505	1,319			75,576	6,650
Squid			100,000	4,000				
Turtles, snapper	1,500	60					100	4
Total	11,640	622	12,951,039	523,112	31,800	3,636	357,788	26,244

Fisheries of Maryland, 1930—Continued

CATCH: BY GEAR—Continued

Species	Dip nets		Cast nets		Pots, eel		Spears		Scrapes	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp			24,000	$2,520						
Eels					251,860	$21,957	16,600	$1,244		
Crabs:										
Hard	89,650	$1,585							1,220,485	$21,690
Soft	2,064,758	179,236							3,199,944	270,364
Total	2,154,408	180,821	24,000	2,520	251,860	21,957	16,600	1,244	4,420,429	292,054

Species	Dredges, oyster		Tongs		Rakes		Picks		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams, hard public			72,360	$36,180	6,400	$3,200	720	$360	1,320	$660
Oysters:										
Market, public, spring	1,127,087	$145,247	3,447,586	399,031						
Market public, fall	2,683,550	347,213	7,964,761	924,858						
Market, private, spring	29,652	4,800	452,060	59,215	7,413	1,000				
Market, private, fall	51,150	7,780	1,320,470	177,828	22,240	3,000				
Seed, public, spring			188,404	11,072						
Terrapin, diamond-back									2,100	1,600
Total	3,891,439	505,040	13,445,641	1,608,184	36,053	7,200	720	360	3,420	2,260

OPERATING UNITS: BY COUNTIES

Item	Anne Arundel	Baltimore	Calvert	Caroline	Cecil	Charles	Dorchester	Harford
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	7	110	20				397	
On boats and shore—								
Regular	384		129	3	9	98	730	
Casual	370	46	286	45	102	278	192	52
Total	761	156	435	48	111	376	1,319	52
Vessels:								
Motor—5 to 10 tons	2							
Net tonnage	13							
Sail—								
5 to 10 tons			2				88	
11 to 20 tons		3					4	
21 to 30 tons		7	1				3	
31 to 40 tons		4						
41 to 50 tons		3						
51 to 60 tons		1	1					
Total		18	4				95	
Net tonnage		545	88				786	
Total vessels	2	18	4				95	
Total net tonnage	13	545	88				786	
Boats:								
Motor	407	17	183	6	44	141	508	31
Other	139	20	148	21	41	62	258	11
Accessory boats		8						
Apparatus:								
Purse seines	2	4						
Length, yards	600	1,054						
Haul seines	50	6	17	4	9	31	6	2
Length, yards	1,688	1,400	3,675	900	2,000	4,655	1,850	1,400

Fisheries of Maryland, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Anne Arundel	Baltimore	Calvert	Caroline	Cecil	Charles	Dorchester	Harford
Apparatus—Continued.								
Gill nets—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Anchor	--------	--------	2	--------	--------	--------	--------	--------
Square yards	--------	--------	1, 200	--------	--------	--------	--------	--------
Drift	--------	--------	1	14	26	50	6	76
Square yards	--------	--------	600	9, 200	44, 120	181, 320	2, 400	38, 000
Runaround	--------	--------	--------	--------	1	--------	2	--------
Square yards	--------	--------	--------	--------	600	--------	1, 320	--------
Stake	--------	120	8	--------	--------	470	20	12
Square yards	--------	10, 150	240	--------	--------	30, 515	530	540
Lines—								
Trot, with baits or snoods	111	26	124	--------	--------	27	331	--------
Baits or snoods	64, 650	14, 700	57, 600	--------	--------	25, 200	253, 985	--------
Trot, with hooks	--------	--------	10	2	--------	--------	--------	--------
Hooks	--------	--------	250	200	--------	--------	--------	--------
Pound nets	32	10	38	14	28	54	160	2
Stop nets	--------	--------	--------	4	2	--------	--------	--------
Square yards	--------	--------	--------	8, 100	2, 250	--------	--------	--------
Fyke sets	174	246	--------	60	758	21	16	92
Dip nets	47	--------	95	--------	--------	12	152	--------
Pots, eel	215	450	--------	--------	374	18	4, 124	600
Scrapes	--------	--------	--------	--------	--------	--------	72	--------
Yards at mouth	--------	--------	--------	--------	--------	--------	72	--------
Dredges, oyster	--------	36	8	--------	--------	--------	282	--------
Yards at mouth	--------	58	12	--------	--------	--------	358	--------
Tongs	646	--------	311	--------	--------	185	519	--------

Item	Kent	Prince Georges	Queen Annes	St. Marys	Somerset	Talbot	Wicomico	Worcester
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	35	--------	--------	18	416	124	--------	--------
On boats and shore—								
Regular	418	2	588	415	942	672	303	224
Casual	143	39	157	411	97	74	92	99
Total	596	41	745	844	1, 455	870	395	323
Vessels:								
Sail—								
5 to 10 tons	--------	--------	--------	2	77	25	--------	--------
11 to 20 tons	1	--------	--------	1	14	1	--------	--------
21 to 30 tons	3	--------	--------	1	5	1	--------	--------
31 to 40 tons	1	--------	--------	--------	2	--------	--------	--------
41 to 50 tons	--------	--------	--------	--------	1	--------	--------	--------
Total	5	--------	--------	4	99	27	--------	--------
Net tonnage	120	--------	--------	53	999	205	--------	--------
Boats:								
Motor	262	4	379	330	565	459	200	151
Other	116	21	110	442	814	129	37	66
Accessory boats	10	--------	--------	--------	--------	2	--------	--------
Apparatus:								
Purse seines	5	--------	--------	--------	--------	7	--------	--------
Length, yards	1, 316	--------	--------	--------	--------	2, 042	--------	--------
Haul seines	22	8	12	7	5	3	1	5
Length, yards	4, 493	965	4, 536	2, 190	3, 500	977	480	75
Gill nets—								
Anchor	--------	--------	--------	--------	--------	--------	--------	9
Square yards	--------	--------	--------	--------	--------	--------	--------	1, 645
Drift	65	5	--------	--------	5	14	29	12
Square yards	111, 000	5, 100	--------	--------	6, 000	21, 660	21, 200	7, 200
Runaround	--------	--------	--------	--------	2	--------	--------	--------
Square yards	--------	--------	--------	--------	4, 000	--------	--------	--------
Stake	1, 460	--------	126	4	156	--------	188	--------
Square yards	83, 820	--------	13, 390	935	4, 800	--------	6, 740	--------
Lines—								
Hand	--------	--------	--------	--------	--------	--------	--------	18
Hooks	--------	--------	--------	--------	--------	--------	--------	36

Fisheries of Maryland, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Kent	Prince Georges	Queen Annes	St. Marys	Somerset	Talbot	Wicomico	Worcester
Apparatus—Continued.								
Lines—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Trot, with baits or snoods	245	--------	146	133	63	251	4	49
Baits or snoods	99, 600	--------	78, 600	94, 000	60, 000	187, 800	2, 250	38, 650
Trot, with hooks	10	--------	--------	--------	--------	--------	--------	--------
Hooks	3, 000	--------	--------	--------	--------	--------	--------	--------
Pound nets	37	8	17	77	61	96	20	38
Fyke nets	727	71	119	--------	--------	44	12	48
Dip nets	28	--------	91	258	623	82	--------	5
Cast nets	3	--------	--------	--------	--------	--------	--------	--------
Pots, eel	336	30	1, 110	--------	320	4, 835	--------	240
Spears	--------	--------	--------	--------	--------	18	--------	--------
Scrapes	--------	--------	--------	--------	1, 160	--------	--------	--------
Yards at mouth	--------	--------	--------	--------	1, 160	--------	--------	--------
Dredges, oyster	--------	--------	--------	12	278	54	--------	40
Yards at mouth	--------	--------	--------	12	351	73	--------	34
Tongs	366	--------	659	938	203	545	331	146
Rakes	--------	--------	--------	--------	--------	--------	--------	134
Picks	--------	--------	--------	--------	--------	--------	--------	8

CATCH: BY COUNTIES

Species	Anne Arundel		Baltimore		Calvert		Caroline	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	406, 494	$5, 250	53, 000	$1, 560	450, 800	$5, 641	10, 800	$166
Black bass	600	120	200	40	--------	--------	100	18
Bluefish	31, 425	2, 968	19, 250	1, 929	200	20	--------	--------
Butterfish	80	8	--------	--------	200	30	--------	--------
Carp	13, 022	1, 293	19, 900	1, 990	6, 400	512	11, 700	1, 146
Catfish and bullheads	20, 388	918	56, 436	2, 822	17, 300	865	12, 900	645
Croaker	114, 234	3, 372	3, 124	94	111, 600	2, 486	2, 000	60
Eels	11, 344	1, 244	11, 900	1, 190	50	5	2, 000	160
Flounders	8, 081	358	1, 000	53	2, 900	174	--------	--------
Gizzard shad	17, 975	386	--------	--------	--------	--------	--------	--------
Mullet	--------	--------	--------	--------	400	20	--------	--------
Pike or pickerel	3, 354	671	400	100	150	30	--------	--------
Shad	25, 969	3, 894	500	75	71, 800	10, 526	1, 150	172
Spot	18, 795	968	1, 200	72	1, 600	86	--------	--------
Squeteagues or "sea trout":								
Gray	149, 201	9, 467	25, 259	2, 020	51, 100	3, 452	3, 400	272
Spotted	200	24	--------	--------	--------	--------	--------	--------
Striped bass	68, 340	13, 276	115, 455	18, 720	41, 450	7, 559	12, 500	2, 500
White perch	11, 590	993	23, 600	1, 744	25, 800	2, 104	14, 650	938
Yellow perch	6, 700	670	8, 000	724	800	80	1, 500	150
Crabs:								
Hard	2, 770, 000	56, 620	132, 000	3, 960	671, 400	10, 071	--------	--------
Soft	42, 699	5, 401	--------	--------	150, 927	13, 584	--------	--------
Oysters:								
Market, public, spring	825, 200	107, 538	136, 636	18, 432	206, 660	28, 098	--------	--------
Market, public, fall	1, 343, 517	173, 938	252, 205	34, 022	482, 638	71, 617	--------	--------
Market, private, spring	--------	--------	--------	--------	103, 693	13, 988	--------	--------
Market, private, fall	--------	--------	--------	--------	219, 625	32, 589	--------	--------
Turtles, snapper	--------	--------	--------	--------	--------	--------	1, 600	64
Total	5, 889, 208	389, 377	860, 065	89, 547	2, 617, 493	203, 537	74, 300	6, 291

Fisheries of Maryland, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Cecil		Charles		Dorchester		Harford	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	112,000	$1,680	16,000	$400	908,008	$13,660	223,000	$3,945
Black bass	4,294	774	4,675	809	----	----	----	----
Bluefish	----	----	600	60	25,400	2,184	----	----
Carp	59,530	6,709	44,450	3,185	3,713	321	2,800	280
Catfish and bullheads	52,550	2,627	67,835	3,006	27,034	1,352	5,700	285
Croaker	----	----	6,550	405	201,878	5,238	----	----
Eels	19,937	1,994	2,410	160	65,240	5,995	10,200	1,020
Flounders	----	----	400	32	25,294	1,095	----	----
Gizzard shad	2,100	63	7,500	138	3,524	141	----	----
Goldfish or "sand perch"	----	----	9,765	500	----	----	----	----
Hickory shad	1,000	35	----	----	----	----	----	----
Mullet	----	----	1,700	121	400	32	----	----
Pike or pickerel	1,659	313	325	63	----	----	200	50
Shad	87,032	12,527	23,805	3,833	120,099	17,990	42,016	5,882
Spot	----	----	600	12	12,500	731	----	----
Squeteagues or "sea trout", gray	----	----	19,100	1,530	41,300	2,478	----	----
Striped bass	26,306	4,734	56,985	7,511	116,088	19,484	11,800	2,200
White perch	48,621	3,699	41,445	3,266	88,500	6,456	8,200	656
Yellow perch	10,676	908	8,665	772	----	----	3,200	256
Crabs:								
Hard	----	----	585,200	8,758	9,639,532	151,502	----	----
Soft	----	----	1,200	150	446,409	37,254	----	----
Oysters:								
Market, public, spring	----	----	16,160	2,143	827,120	99,755	----	----
Market, public, fall	----	----	97,885	15,477	2,010,546	247,113	----	----
Market, private, spring	----	----	8,354	1,240	84,382	10,308	----	----
Market, private, fall	----	----	74,397	12,043	180,136	23,900	----	----
Total	425,705	36,063	1,096,006	65,614	14,827,103	646,989	307,116	14,574

Species	Kent		Prince Georges		Queen Annes		St. Marys	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	400,509	$6,008	800	$16	67,200	$1,024	526,600	$8,433
Black bass	1,310	202	8,000	1,300	----	----	----	----
Bluefish	29,486	2,853	----	----	16,300	1,630	7,550	707
Butterfish	1,500	150	----	----	1,200	120	----	----
Carp	42,000	4,616	13,825	1,232	2,500	238	600	48
Catfish and bullheads	58,140	2,907	18,500	844	19,500	980	200	8
Croaker	85,294	2,559	----	----	102,400	3,682	60,800	1,707
Eels	10,410	833	2,950	274	21,400	1,708	800	64
Flounders	1,400	70	----	----	2,000	116	5,200	339
Goldfish or "sand perch"	----	----	2,900	121	----	----	----	----
Hickory shad	----	----	----	----	----	----	2,850	86
Mullet	----	----	850	52	----	----	----	----
Pike or pickerel	3,430	522	1,100	220	300	50	----	----
Shad	206,183	30,926	2,839	469	16,000	2,400	97,666	15,185
Spot	12,600	756	----	----	12,400	850	4,100	169
Squeteagues or "sea trout":								
Gray	275,487	17,220	3,100	248	29,100	2,451	41,000	2,124
Spotted	----	----	----	----	----	----	180	15
Striped bass	474,183	73,139	5,400	850	60,600	10,674	98,300	19,588
White perch	65,700	4,645	8,600	620	21,340	1,696	19,750	1,647
Yellow perch	31,080	2,586	7,170	660	16,500	1,496	3,125	248
Crabs:								
Hard	2,684,800	40,272	----	----	1,804,200	27,263	1,432,000	26,280
Soft	33,941	4,073	----	----	56,700	6,329	98,510	10,820
Oysters:								
Market, public, spring	290,775	23,074	----	----	627,696	63,227	126,132	13,375
Market, public, fall	850,086	75,322	----	----	1,539,495	154,916	549,437	59,503
Market, private, spring	----	----	----	----	----	----	9,637	1,145
Market, private, fall	----	----	----	----	8,896	960	41,142	5,000
Seed, public, spring	188,404	11,072	----	----	----	----	----	----
Total	5,746,718	303,805	76,034	6,906	4,425,727	281,810	3,125,579	166,491

Fisheries of Maryland, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Somerset		Talbot		Wicomico		Worcester	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	482, 000	$6, 830	1, 997, 896	$29, 974	74, 200	$1, 294	12, 000	$240
Bluefish	42, 200	4, 196	46, 400	4, 604	400	40	48, 400	4, 840
Bonito							5, 200	416
Butterfish	10, 000	600			2, 500	210	600, 000	36, 000
Cabio or crab eater							200	10
Carp			2, 600	212	2, 400	192	800	64
Catfish and bullheads	6, 200	310	16, 400	936	16, 100	805	3, 800	190
Croaker	611, 100	20, 344	302, 000	6, 940	106, 200	3, 186	406, 600	12, 198
Drum:								
Black							40, 000	500
Red or redfish	1, 000	27					15, 000	300
Eels	5, 800	580	126, 400	10, 010	200	16	23, 320	1, 862
Flounders	10, 100	462	2, 400	132	3, 800	190	39, 800	1, 990
Gizzard shad	900	36						
Hickory shad	1, 500	60			1, 200	48		
King whiting or "kingfish"							1, 600	128
Mackerel							800	48
Mullet					800	40	18, 000	916
Pigfish							400	20
Pompano							100	25
Scup or porgy							60, 000	2, 400
Sea bass							20, 200	1, 212
Sea robin							600	6
Shad	110, 800	16, 619	163, 701	24, 555	18, 876	3, 189	10, 000	1, 500
Skates							800	8
Spanish mackerel	200	50					8, 000	960
Spot	9, 600	476	2, 700	177	8, 200	492	42, 000	1, 680
Squeteagues or "sea trout":								
Gray	110, 100	5, 606	146, 200	10, 160	22, 100	1, 432	2, 837, 200	113, 808
Spotted	3, 200	384						
Striped bass	17, 000	3, 064	109, 443	17, 697	13, 740	2, 513	400	60
Tautog							200	10
Tomcod							280	8
White perch	10, 750	702	21, 700	1, 774	10, 000	798		
Whiting							5, 000	200
Yellow perch			10, 100	1, 010				
Crabs:								
Hard	3, 013, 635	54, 906	7, 871, 400	128, 941	71, 600	1, 432	950, 000	19, 000
Soft	4, 392, 387	369, 875	71, 563	5, 998			18, 680	1, 682
Squid							100, 000	4, 000
Clams, hard, public							80, 800	40, 400
Oysters:								
Market, public, spring	537, 635	73, 416	783, 495	88, 623	197, 164	26, 597		
Market, public, fall	1, 267, 119	172, 852	1, 702, 640	192, 747	552, 743	74, 564		
Market, private, spring	69, 193	9, 334			75, 983	8, 200	137, 883	20, 800
Market, private, fall	153, 197	20, 666	74, 871	9, 090	269, 463	29, 080	372, 133	55, 280
Terrapin, diamond-back	1, 800	1, 300	300	300				
Total	10, 867, 416	762, 795	13, 452, 209	533, 880	1, 447, 669	154, 308	5, 860, 196	322, 761

Industries related to the fisheries of Maryland, 1930

TRANSPORTING

Item	Anne Arundel County	Baltimore County	Calvert County	Dorchester County	St. Marys County	Somerset County	Talbot County	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Persons engaged on vessels	49	20	19	76	9	153	28	354
Vessels:								
Motor—								
5 to 10 tons	15	1	5	13	1	31	7	73
11 to 20 tons	6	1	1	9		23	4	44
21 to 30 tons	2		2	3		12	2	21
31 to 40 tons			1	3		5		9
41 to 50 tons		1		3				4
Total	23	3	9	31	1	71	13	151
Net tonnage	260	75	126	554	9	1,045	158	2,227
Sail—								
5 to 10 tons				1		1	1	3
11 to 20 tons	1			1	1	3		6
21 to 30 tons				2	2		1	5
31 to 40 tons				1		1		2
41 to 50 tons		1		1		1		3
51 to 60 tons		2						2
71 to 80 tons		1						1
81 to 90 tons		1						1
Total	1	5		6	3	6	2	23
Net tonnage	12	303		152	63	146	31	707
Total vessels	24	8	9	37	4	77	15	174
Total net tonnage	272	378	126	706	72	1,191	189	2,934

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Anne Arundel County	Baltimore County	Calvert County	Caroline and Dorchester Counties	Cecil and Harford Counties	Kent County	Queen Annes County
Establishments	11	60	9	35	7	11	14
Persons engaged:							
Proprietors	17	81	11	47	6	15	17
Salaried employees	4	133	1	22	3	2	
Wage earners—							
Average for season	293	714	137	1,552	143	108	280
Average for year	180	363	79	633	27	54	153
Paid to salaried employees	$6,293	$210,705	$1,120	$36,028	$760	$2,340	
Paid to wage earners	79,773	334,519	32,810	302,476	10,980	26,336	$59,255
Total, salaries and wages	86,066	545,224	33,930	338,504	11,740	28,676	59,255

Item	Charles and St. Marys Counties	Somerset County	Talbot County	Wicomico County	Worcester County	Total
Establishments	7	137	19	6	7	323
Persons engaged:						
Proprietors	9	261	31	5	9	509
Salaried employees	1	41	6	3		216
Wage earners—						
Average for season	142	1,749	777	179	47	6,121
Average for year	47	868	389	68	30	2,891
Paid to salaried employees	$600	$42,643	$4,265	$1,480		$306,234
Paid to wage earners	21,865	418,228	126,277	19,421	$18,050	1,449,990
Total, salaries and wages	22,465	460,871	130,542	20,901	18,050	1,756,224

Industries related to the fisheries of Maryland, 1930—Continued

PRODUCTS MANUFACTURED

Item	Quantity	Value
Alewives:		
Corned ... pounds	116,800	$3,990
Pickled ... do	404,826	19,716
Salted, tight-pack ... do	2,157,400	53,245
Canned ... standard cases	38,493	117,581
Roe, canned ... do	14,975	82,581
Crab meat, packaged (fresh-cooked) ... pounds	3,351,023	939,945
Oysters:		
Fresh-shucked ... gallons	1,835,283	2,958,141
Shell products—		
Poultry feed ... tons	40,625	310,263
Lime ... do	20,080	50,944
Miscellaneous [1]	[2]	619,185
Total		5,155,591

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 52]

Item	Quantity	Value
Alewives, salted ... pounds	40,000	$1,800
Eels, salted ... do	63,400	6,340
Total	103,400	8,140

[1] Includes smoked alewives, butterfish, carp, cisco, eels, herring, lake trout, salmon, shad, and sturgeon; corned shad; canned terrapin meat and oysters; dry scrap and oil from alewife cuttings and waste; dry scrap from blue crab shells; and marine-shell products.

[2] Data not available.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products 49 have also been included as fishermen. This fact should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

VIRGINIA

Fisheries of Virginia, 1930

OPERATING UNITS: BY GEAR

Item	Purse seines, menhaden	Haul seines	Gill nets			Lines, trot, with baits or snoods	Pound nets	Fyke nets	Dip nets	Otter trawls
			Anchor	Drift	Stake					
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	1,036						6			46
On boats and shore—										
Regular		398	2	519	264	1,335	1,242	82	467	
Casual		221		390	260	71	1,101	81	245	
Total	1,036	619	2	909	524	1,406	2,349	163	712	46
Vessels:										
Steam—										
61 to 70 tons	2									
71 to 80 tons	1									
81 to 90 tons	5									
91 to 100 tons	3									
101 to 110 tons	3									
111 to 120 tons	2									
131 to 140 tons	2									
141 to 150 tons	1									
151 to 160 tons	2									
161 to 170 tons	2									

Fisheries of Virginia, 1930—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Purse seines, menhaden	Haul seines	Gill nets			Lines, trot, with baits or snoods	Pound nets	Fyke nets	Dip nets	Otter trawls
			Anchor	Drift	Stake					
Vessels—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Steam—Continued.										
171 to 180 tons	1									
191 to 200 tons	1									
Total	25									
Net tonnage	2, 902									
Motor—										
5 to 10 tons							1			2
11 to 20 tons										9
21 to 30 tons										1
61 to 70 tons	1									
71 to 80 tons	3									
131 to 140 tons	1									
181 to 190 tons	1									
Total	6						1			12
Net tonnage	609						7			173
Total vessels	31						1			12
Total net tonnage	3, 511						7			173
Boats.										
Motor		159	1	235	172	1, 094	731	106	227	
Other		162	1	424	302	283	377	62	470	
Accessory boats	62									
Apparatus:										
Number	31	187	1	652	16, 453	1, 386	2, 262	1, 084	712	12
Length, yards	8, 720	59, 430								
Square yards			9, 600	663, 042	607, 190					
Yards at mouth										358
Hooks, baits, or snoods						662, 440				

Item	Pots, eel	Scrapes	Dredges			Tongs	Rakes	Picks	By hand	Total, exclusive of duplication
			Crab	Oyster	Scallop					
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			148	205		11				1, 452
On boats and shore—										
Regular	8	326	18	164	443	3, 092	948	477	450	5, 718
Casual		12		12	36	1, 707				3, 694
Total	8	338	166	381	479	4, 810	948	477	450	10, 864
Vessels:										
Steam—										
61 to 70 tons										2
71 to 80 tons										1
81 to 90 tons										5
91 to 100 tons										3
101 to 110 tons										3
111 to 120 tons										2
131 to 140 tons										2
141 to 150 tons										1
151 to 160 tons										2
161 to 170 tons										2
171 to 180 tons										1
191 to 200 tons										1
Total										25
Net tonnage										2, 902

Fisheries of Virginia, 1930—Continued

OPERATING UNITS: By gear—Continued

Item	Pots, eel	Scrapes	Dredges			Tongs	Rakes	Picks	By hand	Total, exclusive of duplication
			Crab	Oyster	Scallop					
Vessels—Continued.										
Motor—										
5 to 10 tons			38	6		4				51
11 to 20 tons			6	9						24
21 to 30 tons			1	1						3
41 to 50 tons				1						1
61 to 70 tons										1
71 to 80 tons										3
131 to 140 tons										1
181 to 190 tons										1
Total			45	17		4				85
Net tonnage			389	233		29				1, 440
Sail—										
5 to 10 tons				24						24
11 to 20 tons				3						3
Total				27						27
Net tonnage				219						219
Total vessels			45	44		4				137
Total net tonnage			389	452		29				4, 561
Boats:										
Motor	8		6	56	348	2, 928	73		12	4, 530
Other		256		28	193	748	858	421	438	3, 168
Accessory boats										62
Apparatus:										
Number	640	618	102	256	924	4, 820	948	477		31, 627
Yards at mouth		618	182	293	617					

CATCH: By gear

Species	Purse seines, menhaden		Haul seines		Gill nets			
					Anchor		Drift	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			33, 400	$668			18, 400	$359
Bluefish			19, 600	1, 896			4, 000	360
Butterfish			5, 300	265				
Carp			126, 300	5, 947				
Catfish and bullheads			139, 100	5, 191				
Croaker			931, 000	23, 781	18, 000	$540	316, 400	8, 390
Drum, red or redfish			10, 275	410			1, 200	36
Flounders			33, 150	1, 618				
Gizzard shad			61, 700	1, 406			6, 000	200
Hickory shad			1, 200	48			13, 100	524
Menhaden	114, 953, 600	$762, 190						
Mullet							90, 900	3, 825
Pigfish			44, 000	2, 208			13, 000	650
Pike or pickerel			80	20				
Pompano			2, 000	400				
Shad			14, 100	2, 115			758, 498	115, 582
Spanish mackerel			16, 300	2, 445			6, 000	850
Spot			1, 749, 000	87, 623			95, 800	4, 523
Squeteagues or "sea trout":								
Gray			641, 300	40, 734			30, 600	1, 801
Spotted			194, 800	23, 385				
Striped bass			65, 860	9, 919			45, 300	7, 195
White perch			53, 000	2, 841				
Whiting			3, 600	148				
Yellow perch			5, 460	372				
Total	114, 953, 600	762, 190	4, 150, 525	213, 440	18, 000	540	1, 399, 198	144, 295

Fisheries of Virginia, 1930—Continued

CATCH: BY GEAR—Continued

Species	Gill nets, stake		Lines, trot with baits or snoods		Pound nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	2,000	$38			15,220,718	$178,205
Bluefish					206,166	13,898
Bonito					43,615	2,181
Butterfish					3,668,698	163,360
Carp					15,850	780
Catfish and bullheads					32,300	1,583
Cod					49,743	1,193
Croaker	5,000	150			17,492,421	390,002
Drum:						
Black					24,370	517
Red or redfish					24,725	991
Eels					28,800	2,624
Flounders	8,500	425			258,450	11,741
Gizzard shad	600	20			12,150	356
Harvestfish or "starfish"					400	20
Hickory shad	1,000	20			67,800	2,196
King whiting or "kingfish"					2,400	120
Mackerel					47,874	4,747
Menhaden					888,000	5,020
Mullet	2,000	80			100	5
Pigfish	100	6			11,600	580
Scup or porgy					91,997	3,680
Sea bass					20,207	1,390
Shad	710,967	111,109			4,639,844	751,259
Skates					1,800	27
Spanish mackerel					27,850	3,185
Spot	2,500	163			589,235	28,671
Squeteagues or "sea trout":						
Gray	25,500	1,742			14,660,362	528,790
Spotted					3,200	384
Striped bass	63,000	10,310			192,550	31,001
Sturgeon					2,000	600
Tautog					800	32
White perch					58,100	3,046
Whiting					17,255	707
Crabs, hard			20,113,470	$373,069		
Squid					125,345	3,847
Total	821,167	124,063	20,113,470	373,069	58,526,725	2,136,738

Species	Fyke nets		Dip nets		Otter trawls		Pots, eel	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	112,500	$2,263						
Bluefish	200	24			40	$4		
Butterfish	500	25			507	25		
Carp	100,600	5,030						
Catfish and bullheads	236,387	8,697						
Cod					360	7		
Croaker	182,600	5,417			962,780	34,483		
Eels	5,965	514					40,000	$3,488
Flounders	10,000	485			249,464	11,745		
Gizzard shad	55,300	1,252						
Hake					1,422	42		
Hickory shad	800	40						
King whiting or "kingfish"					589	24		
Scup or porgy					311,517	16,781		
Sea bass					171,366	13,089		
Shad	59,600	9,060						
Spot	1,400	74			55,000	3,820		
Squeteagues or "sea trout," gray	28,200	2,150			126,427	5,491		
Striped bass	58,465	8,651						
Sturgeon					2,590	780		
White perch	84,550	3,850			595	24		
Whiting	800	40			52	2		
Yellow perch	41,200	3,228						
Crabs:								
Hard			308,400	$5,397				
Soft			897,040	75,967				
Squid					38	2		
Total	979,067	50,800	1,205,440	81,364	1,882,747	86,319	40,000	3,488

Fisheries of Virginia, 1930—Continued

CATCH: By gear—Continued

Species	Scrapes		Dredges					
			Crab		Oyster		Scallops	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs:								
Hard	1, 024, 000	$15, 360	7, 494, 000	$149, 230				
Soft	1, 983, 960	119, 038						
Oysters:								
Market, public, spring					81, 634	$11, 900		
Market, public, fall					296, 557	43, 130		
Market, private, spring					940, 314	111, 876		
Market, private, fall					3, 287, 751	393, 033		
Scallops, bay							1, 824, 948	$147, 564
Total	3, 007, 960	134, 398	7, 494, 000	149, 230	4, 606, 256	559, 939	1, 824, 948	147, 564

Species	Tongs		Rakes		Picks		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams, hard, public	1, 018, 424	$321, 592	132, 400	$44, 075	18, 712	$7, 204	43, 200	$18, 900
Oysters:								
Market, public, spring	1, 492, 681	173, 090	6, 860	500				
Market, public, fall	4, 526, 393	522, 843	20, 580	1, 500				
Market, private, spring	1, 896, 680	223, 588	133, 468	10, 103			10, 290	750
Market, private, fall	6, 356, 188	747, 073	537, 611	40, 309			30, 870	2, 250
Seed, public, spring	2, 509, 715	125, 483						
Seed, public, fall	5, 537, 205	280, 605						
Total	23, 337, 286	2, 394, 274	830, 919	96, 487	18, 712	7, 204	84, 360	21, 900

OPERATING UNITS: By counties

Item	Accomac	Alexandria	Caroline	Charles City	Chesterfield	Dinwiddie	Elizabeth City	Essex	Fairfax
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	41						96		
On boats and shore—									
Regular	1, 255			231			344		
Casual	282	18	10		14	10		144	36
Total	1, 578	18	10	231	14	10	440	144	36
Vessels:									
Motor—									
5 to 10 tons	1						15		
11 to 20 tons							9		
21 to 30 tons							1		
Total	1						25		
Net tonnage	6						279		
Sail, 5 to 10 tons	9								
Net tonnage	62								
Total vessels	10						25		
Total net tonnage	68						279		
Boats:									
Motor	768	10		2	5	2	114	45	26
Other	782		5	165	4	7	26	61	14
Apparatus:									
Haul seines	8			9	3			7	5
Length, yards	3, 280			2, 700	600			1, 960	840
Gill nets—									
Anchor	1								
Square yards	9, 600								
Drift	4	8	5	231	7		11	10	6
Square yards	7, 600	14, 400	6, 000	254, 100	4, 200		9, 900	7, 000	10, 800
Stake	145			40		330			
Square yards	2, 400			1, 320		6, 600			
Lines, trot, with baits or snoods	267						14		
Baits or snoods	146, 800						10, 500		

Fisheries of Virginia, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Accomac	Alexandria	Caroline	Charles City	Chesterfield	Dinwiddie	Elizabeth City	Essex	Fairfax
Apparatus—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Pound nets	326	-------	-------	-------	-------	-------	365	6	-------
Fyke nets	5	11	2	21	-------	-------	-------	4	340
Dip nets	290	-------	-------	-------	-------	-------	-------	-------	-------
Otter trawls	-------	-------	-------	-------	-------	-------	5	-------	-------
Yards at mouth	-------	-------	-------	-------	-------	-------	150	-------	-------
Pots, eel	640	-------	-------	-------	-------	-------	-------	-------	-------
Scrapes	618	-------	-------	-------	-------	-------	-------	-------	-------
Yards at mouth	618	-------	-------	-------	-------	-------	-------	-------	-------
Dredges—									
Crab	-------	-------	-------	-------	-------	-------	32	-------	-------
Yards at mouth	-------	-------	-------	-------	-------	-------	56	-------	-------
Oyster	122	-------	-------	-------	-------	-------	8	6	-------
Yards at mouth	130	-------	-------	-------	-------	-------	13	6	-------
Scallop	697	-------	-------	-------	-------	-------	-------	-------	-------
Yards at mouth	465	-------	-------	-------	-------	-------	-------	-------	-------
Tongs	819	-------	-------	-------	-------	-------	60	106	-------
Rakes	474	-------	-------	-------	-------	-------	-------	-------	-------
Picks	168	-------	-------	-------	-------	-------	-------	-------	-------

Item	Gloucester	Henrico	Isle of Wight	James City	King and Queen	King George	King William	Lancaster	Mathews
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	3	-------	-------	-------	-------	-------	-------	322	18
On boats and shore—									
Regular	193	-------	402	101	-------	29	-------	295	308
Casual	334	200	-------	-------	57	59	83	522	378
Total	530	200	402	101	57	88	83	1,139	704
Vessels:									
Steam—									
61 to 70 tons	-------	-------	-------	-------	-------	-------	-------	2	-------
81 to 90 tons	-------	-------	-------	-------	-------	-------	-------	1	-------
91 to 100 tons	-------	-------	-------	-------	-------	-------	-------	1	-------
141 to 150 tons	-------	-------	-------	-------	-------	-------	-------	1	-------
Total	-------	-------	-------	-------	-------	-------	-------	5	-------
Net tonnage	-------	-------	-------	-------	-------	-------	-------	463	-------
Motor—									
5 to 10 tons	1	-------	-------	-------	-------	-------	-------	2	2
11 to 20 tons	-------	-------	-------	-------	-------	-------	-------	2	2
61 to 70 tons	-------	-------	-------	-------	-------	-------	-------	1	-------
71 to 80 tons	-------	-------	-------	-------	-------	-------	-------	3	-------
Total	1	-------	-------	-------	-------	-------	-------	8	4
Net tonnage	8	-------	-------	-------	-------	-------	-------	329	36
Total vessels	1	-------	-------	-------	-------	-------	-------	13	4
Total net tonnage	8	-------	-------	-------	-------	-------	-------	792	36
Boats:									
Motor	338	20	279	39	-------	40	10	439	363
Other	126	150	91	40	49	38	68	33	32
Accessory boats	-------	-------	-------	-------	-------	-------	-------	18	-------
Apparatus:									
Purse seines, menhaden	-------	-------	-------	-------	-------	-------	-------	9	-------
Length, yards	-------	-------	-------	-------	-------	-------	-------	2,430	-------
Haul seines	-------	20	3	2	-------	2	2	3	-------
Length, yards	-------	4,000	600	600	-------	1,300	400	600	-------
Gill nets—									
Drift	18	-------	12	19	42	-------	54	3	10
Square yards	13,200	-------	4,800	19,200	37,800	-------	54,000	1,800	11,000
Stake	-------	1,700	8,400	2,620	-------	237	-------	-------	-------
Square yards	-------	51,000	278,640	78,600	-------	54,550	-------	-------	-------
Lines, trot, with baits or snoods	78	-------	77	-------	-------	17	-------	86	130
Baits or snoods	44,800	-------	38,500	-------	-------	4,250	-------	34,400	104,000
Pound nets	95	-------	20	-------	-------	25	-------	231	463
Fyke nets	12	-------	136	54	4	46	8	8	-------
Dip nets	-------	-------	-------	-------	-------	-------	-------	-------	147
Dredges—									
Oyster	-------	-------	-------	-------	-------	-------	-------	8	8
Yards at mouth	-------	-------	-------	-------	-------	-------	-------	11	11
Tongs	450	-------	336	15	-------	29	20	510	194

Fisheries of Virginia, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Middlesex	Nansemond	New Kent	Norfolk	Northampton	Northumberland	Prince George	Princess Anne
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	5			26	3	767		
On boats and shore—								
Regular	200	50	68	95	589	505		66
Casual	543	121		111	30	418	37	
Total	748	171	68	232	622	1,690	37	66
Vessels:								
Steam—								
71 to 80 tons						1		
81 to 90 tons						4		
91 to 100 tons						2		
101 to 110 tons						3		
111 to 120 tons						2		
131 to 140 tons						2		
151 to 160 tons						2		
161 to 170 tons						2		
171 to 180 tons						1		
191 to 200 tons						1		
Total						20		
Net tonnage						2,439		
Motor—								
5 to 10 tons	1							
11 to 20 tons				3	1			
21 to 30 tons				1				
41 to 50 tons				1				
131 to 140 tons						1		
181 to 190 tons						1		
Total	1			5	1	2		
Net tonnage	8			114	11	317		
Sail, 5 to 10 tons						8		
Net tonnage						58		
Total vessels	1			5	1	30		
Total net tonnage	8			114	11	2,814		
Boats:								
Motor	474	76	16	20	331	377	16	31
Other	6	28	39	169	513	400	13	12
Accessory boats						44		
Apparatus:								
Purse seines, menhaden						22		
Length, yards						6,290		
Haul seines	9		3	7	15		6	2
Length, yards	2,700		800	2,750	5,020		1,800	500
Gill nets—								
Drift	2	1	60		45		32	
Square yards	1,200	300	60,000		15,960		25,600	
Stake		1,180		90				
Square yards		57,200		7,200				
Lines, trot, with baits or snoods	97	21		89	106	264		
Baits or snoods	24,250	4,200		35,600	54,600	83,200		
Pound nets	21			13	131	368		6
Fyke nets		21	14		1		35	
Dip nets						275		
Otter trawls				1				
Yards at mouth				30				
Dredges—								
Crab					2			
Yards at mouth					3			
Oyster	2			8		30		
Yards at mouth	3			12		34		
Scallop					227			
Yards at mouth					152			
Tongs	628	130		127	229	251		46
Rakes					304			
Picks					309			

Fisheries of Virginia, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Prince William	Richmond	Spotsylvania	Stafford	Surry	Warwick	Westmoreland	York
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels							51	120
On boats and shore—								
Regular	42				39	302	154	450
Casual	38	108	13	36		4	70	18
Total	80	108	13	36	39	306	275	588
Vessels:								
Motor—								
5 to 10 tons							2	27
11 to 20 tons								7
21 to 30 tons								1
Total							2	35
Net tonnage							15	317
Sail—								
5 to 10 tons							7	
11 to 20 tons							3	
Total							10	
Net tonnage							99	
Total vessels							22	35
Total net tonnage							114	317
Boats:								
Motor	31	35	13	15	26	166	95	308
Other	10	35		4	10	13	46	179
Apparatus:								
Haul seines	14			4	9		7	47
Length, yards	1, 680			600	2, 700		1, 200	22, 800
Gill nets—								
Drift	18	16		5	8		4	21
Square yards	30, 062	26, 720		9, 000	8, 400		4, 800	25, 200
Stake	1			20	1, 384	306		
Square yards	1, 000			9, 320	44, 960	14, 400		
Lines, trot, with baits or snoods		1	6	2		8	64	59
Baits or snoods		400	1, 480	460		4, 000	25, 600	45, 400
Pound nets		30		6		56	64	36
Fyke nets	207	6	40	44	18	17	19	11
Otter trawls								6
Yards at mouth								178
Dredges—								
Crab								68
Yards at mouth								123
Oyster		2					62	
Yards at mouth		2					71	
Tongs		62				273	139	396
Rakes								170

CATCH: BY COUNTIES

Species	Accomac		Alexandria		Caroline		Charles City	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	898, 900	$13, 484			1, 500	$30	16, 800	$336
Bluefish	57. 000	4, 231						
Bonito	6, 800	340						
Butterfish	1, 537, 975	61, 864						
Carp							43, 000	2, 150
Catfish and bullheads			1, 800	$72	300	15	28, 800	864
Cod	20, 800	624						
Croaker	2, 159, 130	64, 794						
Drum:								
Black	20, 370	407						
Red or redfish	10, 800	431						
Eels	56, 900	4, 840			200	10		
Flounders	40, 100	1, 891						

Fisheries of Virginia, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Accomac		Alexander		Caroline		Charles City	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Gizzard shad							24, 200	$484
Harvestfish or "starfish"	400	$20						
Mackerel	3, 200	320						
Mullet	100	5						
Pigfish	1, 400	79						
Scup or porgy	27, 100	1, 084						
Sea bass	11, 300	678						
Shad	304, 600	45, 700	5, 940	$990	1, 200	$240	539, 700	80, 955
Skates	1, 800	2						
Spanish mackerel	1, 600	160						
Spot	45, 700	2, 363						
Squeteagues or "sea trout":								
Gray	5, 543, 661	169, 688						
Spotted	300	45						
Striped bass	8, 650	1, 675					34, 900	5, 236
Sturgeon	1, 000	300						
Tautog	800	32						
White perch	5, 000	338			500	25	6, 150	185
Whiting	15, 500	620						
Yellow perch			2, 400	192				
Crabs:								
Hard	5, 881, 670	132, 896						
Soft	2, 511, 000	158, 565						
Squid	8, 800	352						
Clams, hard, public	368, 976	157, 044						
Oysters:								
Market, public, spring	144, 623	19, 582						
Market, public, fall	386, 547	51, 848						
Market, private, spring	892, 246	100, 920						
Market, private, fall	2, 676, 738	302, 760						
Scallops, bay	1, 442, 988	121, 900						
Total	25, 094, 474	1, 421, 907	10, 140	1, 254	3, 700	320	693, 550	90, 210

Species	Chesterfield		Dinwiddie		Elizabeth City		Essex	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	3, 000	$60			730, 000	$7, 300	14, 400	$288
Bluefish					17, 500	1, 750		
Bonito					1, 000	50		
Butterfish					565, 000	22, 600		
Carp	4, 700	165					13, 500	675
Catfish and bullheads	3, 200	96					20, 100	1, 005
Cod					6, 300	126		
Croaker					7, 798, 000	162, 040	20, 500	615
Flounders					68, 650	3, 793		
Gizzard shad	2, 300	46			200	10		
Hickory shad					9, 000	360		
Scup or porgy					128, 000	8, 240		
Sea bass					34, 000	3, 300		
Shad	11, 400	1, 710	4, 400	$660	730, 000	109, 500	1, 500	225
Spanish mackerel					18, 250	1, 825		
Spot					151, 000	6, 160	1, 400	70
Squeteagues or "sea trout," gray					793, 200	24, 774		
Striped bass	1, 400	210	800	120	13, 000	1, 560		
Sturgeon					1, 000	300		
White perch	1, 200	60			3, 650	108	7, 200	576
Crabs, hard					2, 576, 000	48, 160		
Clams, hard, public					113, 600	35, 500		
Oysters:								
Market, public, spring					17, 664	1, 545	36, 907	5, 380
Market, public, fall					32, 928	2, 880	115, 687	16, 864
Market, private, spring					114, 130	13, 308	31, 597	4, 606
Market, private, fall					255, 528	24, 751	178, 277	25, 988
Seed, public, spring					65, 001	3, 250		
Seed, public, fall					130, 003	6, 500		
Total	27, 200	2, 347	5, 200	780	14, 372, 604	489, 690	441, 068	56, 292

Fisheries of Virginia, 1930—Continued

CATCH: By counties—Continued

Species	Fairfax		Gloucester		Henrico		Isle of Wight	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	--------	--------	46, 600	$498	8, 000	$160	70, 000	$1, 400
Bluefish	--------	--------	1, 800	180	--------	--------	--------	--------
Butterfish	--------	--------	8, 900	445	--------	--------	--------	--------
Carp	--------	--------	--------	--------	10, 000	500	43, 500	2, 175
Catfish and bullheads	93, 687	$3, 744	--------	--------	8, 500	255	43, 000	1, 290
Croaker	--------	--------	2, 993, 200	59, 876	--------	--------	164, 000	4, 920
Drum:								
Black	--------	--------	600	18	--------	--------	--------	--------
Red or redfish	--------	--------	200	10	--------	--------	--------	--------
Eels	--------	--------	--------	--------	--------	--------	1, 500	120
Flounders	--------	--------	9, 000	450	--------	--------	18, 500	925
Gizzard shad	--------	--------	1, 800	90	9, 000	180	25, 000	500
Hickory shad	--------	--------	5, 300	164	--------	--------	1, 000	20
King whiting or "kingfish"	--------	--------	2, 400	120	--------	--------	--------	--------
Mullet	--------	--------	--------	--------	--------	--------	8, 500	340
Shad	3, 900	630	132, 600	19, 890	38, 000	5, 700	349, 400	52, 410
Spot	--------	--------	75, 600	3, 780	--------	--------	--------	--------
Squeteagues or "sea trout," gray	--------	--------	1, 666, 400	50, 040	--------	--------	45, 000	3, 150
Striped bass	--------	--------	400	60	8, 400	1, 260	44, 200	6, 630
White perch	12, 400	744	2, 200	132	--------	--------	33, 000	1, 030
Yellow perch	18, 000	1, 440	500	40	2, 000	100	--------	--------
Crabs, hard	--------	--------	1, 420, 000	22, 400	--------	--------	192, 500	3, 012
Clams, hard, public	--------	--------	40, 960	12, 800	--------	--------	--------	--------
Oysters:								
Market, public, spring	--------	--------	116, 599	13, 089	--------	--------	252, 530	22, 086
Market, public, fall	--------	--------	235, 806	26, 470	--------	--------	757, 605	55, 219
Market, private, spring	--------	--------	54, 880	6, 355	--------	--------	222, 950	19, 500
Market, private, fall	--------	--------	164, 640	19, 065	--------	--------	668, 850	58, 500
Seed, public, spring	--------	--------	105, 002	5, 250	--------	--------	722, 514	36, 125
Seed, public, fall	--------	--------	215, 004	10, 750	--------	--------	1, 806, 297	90, 315
Total	127, 987	6, 558	7, 300, 391	251, 972	83, 900	8, 155	5, 469, 846	359, 665

Species	James City		King and Queen		King George		King William	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	25, 800	$516	1, 200	$36	22, 600	$408	2, 800	$56
Carp	21, 500	1, 075	--------	--------	--------	--------	--------	--------
Catfish and bullheads	18, 500	555	1, 500	75	13, 200	528	2, 200	110
Croaker	8, 400	252	500	15	--------	--------	2, 000	64
Flounders	--------	--------	--------	--------	--------	--------	800	48
Gizzard shad	14, 800	296	--------	--------	--------	--------	--------	--------
Hickory shad	--------	--------	10, 800	432	--------	--------	3, 000	120
Shad	255, 900	38, 835	17, 940	2, 691	12, 840	2, 175	28, 650	4, 295
Squeteagues or "sea trout," gray	8, 000	800	600	30	--------	--------	500	25
Striped bass	25, 500	3, 825	2, 400	360	18, 260	3, 539	2, 200	210
White perch	9, 600	422	1, 200	60	8, 000	480	1, 800	90
Yellow perch	--------	--------	800	64	2, 600	208	500	40
Crabs, hard	--------	--------	--------	--------	102, 000	2, 040	--------	--------
Oysters:								
Market, public, spring	--------	--------	--------	--------	4, 445	648	4, 802	420
Market, public, fall	--------	--------	--------	--------	13, 459	1, 962	15, 092	1, 760
Market, private, spring	--------	--------	--------	--------	--------	--------	61, 740	7, 200
Market, private, fall	--------	--------	--------	--------	--------	--------	185, 220	21, 600
Seed, public, spring	35, 001	1, 750	--------	--------	--------	--------	--------	--------
Seed, public, fall	65, 001	3, 250	--------	--------	--------	--------	--------	--------
Total	488, 002	51, 576	36, 940	3, 763	197, 404	11, 988	311, 304	36, 038

Species	Lancaster		Matthews		Middlesex		Nansemond	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	1, 496, 500	$14, 971	1, 626, 000	$16, 260	51, 500	$1, 030	1, 600	$32
Bluefish	9, 460	757	21, 250	1, 700	--------	--------	--------	--------
Butterfish	480, 000	33, 600	2, 100	105	--------	--------	--------	--------
Carp	1, 800	90	--------	--------	12, 000	480	--------	--------
Catfish and bullheads	2, 500	125	--------	--------	2, 000	80	400	20
Croaker	301, 200	9, 036	1, 226, 400	24, 688	256, 500	5, 305	49, 200	1, 476
Eels	2, 800	224	--------	--------	--------	--------	--------	--------
Flounders	50, 400	2, 040	25, 800	1, 032	1, 200	60	--------	--------
Gizzard shad	1, 000	40	950	36	--------	--------	6, 600	220
Hickory shad	2, 200	88	--------	--------	--------	--------	--------	--------

Fisheries of Virginia, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Lancaster		Matthews		Middlesex		Nansemond	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Menhaden	30, 578, 600	$202, 804	--------	--------	--------	--------	--------	--------
Pigfish	--------	--------	1, 700	$85	--------	--------	--------	--------
Pike or pickerel	--------	--------	--------	--------	80	$20	--------	--------
Shad	930, 884	126, 221	1, 100, 030	220, 060	48, 200	7, 230	35, 800	$8, 950
Spanish mackerel	--------	--------	800	80	--------	--------	--------	--------
Spot	90, 600	4, 530	48, 200	1, 648	16, 000	800	--------	--------
Squeteagues or "sea trout," gray	315, 400	9, 474	1, 322, 700	39, 761	27, 700	1, 385	--------	--------
Striped bass	21, 750	3, 262	1, 400	210	20, 500	3, 075	400	60
White perch	9, 200	552	700	42	11, 000	330	200	20
Whiting	1, 200	60	--------	--------	--------	--------	--------	--------
Yellow perch	700	70	--------	--------	--------	--------	--------	--------
Crabs:								
Hard	856, 400	12, 846	2, 175, 000	32, 625	730, 000	14, 600	105, 000	2, 100
Soft	--------	--------	50, 000	4, 440	--------	--------	--------	--------
Oysters:								
Market, public, spring	206, 417	30, 090	38, 690	5, 076	239, 675	34, 938	70, 315	6, 030
Market, public, fall	564, 647	82, 310	195, 236	25, 614	719, 010	104, 812	210, 945	15, 375
Market, private, spring	59, 682	8, 700	20, 580	2, 400	129, 201	18, 834	161, 896	14, 160
Market, private, fall	1, 222, 315	178, 180	322, 420	37, 600	258, 389	37, 666	620, 144	45, 200
Seed, public, spring	--------	--------	--------	--------	20, 000	1, 000	16, 500	825
Seed, public, fall	--------	--------	--------	--------	40, 001	2, 000	64, 001	3, 200
Total	37, 205, 655	720, 070	8, 179, 956	413, 462	2, 582, 956	233, 645	1, 343, 001	97, 668

Species	New Kent		Norfolk		Northampton		Northumberland	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	7, 200	$144	19, 500	$293	57, 600	$897	9, 762, 711	$114, 289
Bluefish	--------	--------	440	44	92, 156	4, 720	10, 400	832
Bonito	--------	--------	--------	--------	35, 815	1, 791	--------	--------
Butterfish	--------	--------	10, 507	525	1, 016, 823	40, 673	21, 400	1, 498
Carp	12, 000	600	--------	--------	--------	--------	--------	--------
Catfish and bullheads	6, 000	180	--------	--------	--------	--------	--------	--------
Cod	--------	--------	3, 360	67	19, 643	383	--------	--------
Croaker	--------	--------	596, 780	13, 883	1, 174, 291	35, 311	1, 292, 400	35, 932
Drum, black	--------	--------	--------	--------	2, 400	72	--------	--------
Eels	--------	--------	--------	--------	9, 865	1, 163	1, 800	144
Flounders	--------	--------	10, 064	545	57, 750	2, 852	38, 800	1, 675
Gizzard shad	6, 500	140	--------	--------	--------	--------	--------	--------
Hake	--------	--------	1, 422	42	--------	--------	--------	--------
Hickory shad	800	40	--------	--------	--------	--------	51, 800	1, 604
King whiting or "kingfish"	--------	--------	589	24	--------	--------	--------	--------
Mackerel	--------	--------	--------	--------	44, 674	4, 427	--------	--------
Menhaden	--------	--------	--------	--------	48, 000	340	85, 215, 000	564, 066
Mullet	--------	--------	--------	--------	84, 400	3, 565	--------	--------
Pigfish	--------	--------	200	10	1, 400	70	--------	--------
Scup or porgy	--------	--------	13, 517	541	64, 897	2, 596	--------	--------
Sea bass	--------	--------	7, 366	589	8, 907	712	--------	--------
Shad	61, 800	10, 070	32, 450	5, 841	13, 407	2, 061	1, 037, 023	162, 143
Spanish mackerel	--------	--------	--------	--------	200	20	--------	--------
Spot	--------	--------	1, 417, 000	70, 850	122, 135	7, 416	4, 100	222
Squeteagues or "sea trout":								
Gray	--------	--------	118, 527	5, 706	5, 007, 351	245, 970	338, 900	12, 572
Spotted	--------	--------	44, 500	5, 340	--------	--------	--------	--------
Striped bass	7, 500	1, 125	--------	--------	6, 065	923	78, 600	13, 848
Sturgeon	--------	--------	90	30	--------	--------	--------	--------
White perch	2, 300	115	595	24	--------	--------	2, 000	112
Whiting	--------	--------	3, 252	130	1, 755	87	--------	--------
Yellow perch	100	10	--------	--------	--------	--------	--------	--------
Crabs:								
Hard	--------	--------	1, 441, 800	26, 045	1, 316, 100	25, 572	3, 472, 500	52, 087
Soft	--------	--------	--------	--------	--------	--------	320, 000	32, 000
Squid	--------	--------	38	2	116, 545	3, 495	--------	--------
Clams, hard, public	--------	--------	--------	--------	105, 600	40, 007	--------	--------
Oysters:								
Market, public, spring	--------	--------	--------	--------	2, 278	232	62, 928	9, 173
Market, public, fall	--------	--------	--------	--------	6, 846	698	235, 346	34, 252
Market, private, spring	--------	--------	678, 008	74, 068	142, 098	10, 362	110, 446	16, 100
Market, private, fall	--------	--------	2, 134, 592	233, 932	511, 639	37, 306	475, 398	69, 300
Seed, public, spring	--------	--------	--------	--------	55, 001	2, 750	--------	--------
Seed, public, fall	--------	--------	125, 003	10, 000	110, 002	5, 500	--------	--------
Scallops, bay	--------	--------	--------	--------	381, 960	25, 664	--------	--------
Total	104, 200	12, 424	6, 659, 600	448, 531	10, 617, 603	507, 635	102, 531, 552	1, 121, 849

Fisheries of Virginia, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Prince George		Princess Anne		Prince William		Richmond		Spotsylvania	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	21,500	$430					74,000	$1,480		
Bluefish			2,400	$240						
Butterfish			12,000	600						
Carp	25,500	1,275					4,250	210		
Catfish and bullheads	16,500	495			30,600	$1,224	18,200	910	14,000	$560
Croaker			107,000	2,140			19,000	760		
Eels							1,500	105		
Flounders			1,800	90						
Gizzard shad	15,000	340								
Shad	42,200	6,575	110,000	19,800	6,608	1,042	14,850	2,228		
Spot			151,200	7,560			1,500	75		
Squeteagues or "sea trout":										
Gray			17,000	850						
Spotted			3,200	384						
Striped bass	8,350	1.252			8,200	1,640				
White perch	6,700	335			13,600	816	13,950	698		
Yellow perch					5,460	432			8,400	588
Crab, hard							3,500	70	36,000	720
Oysters:										
Market, public, spring							32,269	4,704		
Market, public, fall							96,808	14,112		
Market, private, spring			132,741	29,025			138,030	18,109		
Market, private, fall			265,139	57,975			201,856	26,608		
Total	135,750	10,702	802,480	118,664	64,468	5,154	619,713	70,069	58,400	1,868

Species	Stafford		Surry		Warwick		Westmoreland		York	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives			20,500	$410	74,000	$1,110	291,307	$5,200	41,500	$415
Bluefish									17,600	1,728
Butterfish					500	25			19,800	1,740
Carp			40,600	1,530			10,400	832		
Catfish and bullheads	11,600	$580	43,600	1,308			27,600	1,380		
Croaker			6,200	186	53,000	1,060	21,800	436	1,658,700	39,974
Drum:										
Black									1,000	20
Red or redfish									25,200	996
Eels									200	20
Flounders					10,000	500			226,700	10,113
Gizzard shad	2,000	60	25,600	768	400	16	400	8		
Pigfish									64,000	3,200
Pompano									2,000	400
Scup or porgy									170,000	8,000
Sea bass									130,000	9,200
Shad	2,205	378	78,200	11,730	81,000	13,230	38,382	6,660	112,000	18,300
Spanish mackerel									29,300	4,395
Spot									368,500	19,400
Squeteagues or "sea trout":										
Gray					20,800	1,248	28,050	709	258,600	14,526
Spotted									150,000	18,000
Striped bass	2,700	405	14,700	2,205	16,240	2,436	35,260	5,440	43,400	6,510
Sturgeon									2,500	750
White perch	6,000	348	12,300	615	6,300	504	19,000	950	500	50
Yellow perch	1,800	144					3,400	272		
Crabs, hard	9,000	135			62,400	1,248	960,000	14,400	7,600,000	152,100
Clams, hard, public									583,600	146,420
Oysters:										
Market, public, spring					64,724	5,661	30,774	4,486	255,535	22,350
Market, public, fall					194,172	16,983	296,791	43,264	766,605	73,050
Market, private, spring									30,527	2,670
Market, private, fall									71,275	6,234
Seed, public, spring					911,519	45,575			579,177	28,958
Seed, public, fall					1,823,537	91,175			1,158,356	57,917
Total	35,305	2,050	241,700	18,752	3,318,592	180,771	1,763,164	84,037	14,366,575	647,436

Industries related to the fisheries of Virginia, 1930

TRANSPORTING

Item	Accomac County	Elizabeth City County	Gloucester County	Isle of Wight County	King and Queen County	Lancaster County	Mathews County	Middlesex County
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Persons engaged on vessels	95	18	23	8	11	83	57	40
Vessels:								
Motor—								
5 to 10 tons	36	3	6	2	3	21	18	9
11 to 20 tons	10	5	6	2	1	14	11	6
21 to 30 tons	4	------	------	------	------	3	------	2
31 to 40 tons	2	------	------	------	1	------	------	1
71 to 80 tons	------	------	------	------	------	2	------	------
Total	52	8	12	4	5	40	29	18
Net tonnage	577	95	123	42	72	585	287	244
Sail—								
21 to 30 tons	------	------	------	------	------	------	1	------
Net tonnage	------	------	------	------	------	------	30	------
Total vessels	52	8	12	4	5	40	30	18
Total net tonnage	577	95	123	42	72	585	317	244

Item	Nansemond County	Norfolk County	Northampton County	Northumberland County	Richmond County	Westmoreland County	York County	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Persons engaged on vessels	26	5	14	74	15	2	30	501
Vessels:								
Motor—								
5 to 10 tons	8	2	8	25	5	------	9	155
11 to 20 tons	5	------	------	9	1	1	6	77
21 to 30 tons	------	------	------	3	------	------	------	12
31 to 40 tons	------	------	------	------	1	------	------	5
71 to 80 tons	------	------	------	------	------	------	------	2
81 to 90 tons	------	------	------	1	------	------	------	1
101 to 110 tons	------	------	------	1	------	------	------	1
Total	13	2	8	39	7	1	15	253
Net tonnage	121	19	59	561	85	19	157	3, 046
Sail—								
21 to 30 tons	------	------	------	------	------	------	------	1
Net tonnage	------	------	------	------	------	------	------	30
Total vessels	13	2	8	39	7	1	15	254
Total net tonnage	121	19	59	561	85	19	157	3, 076

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Accomac County	Arlington and Westmoreland Counties	Elizabeth City County	Essex and Richmond Counties	Gloucester, King William, and Mathews Counties	Isle of Wight County	Lancaster County
Establishments	77	4	20	5	4	3	30
Persons engaged:							
Proprietors	96	4	29	9	5	6	41
Salaried employees	7	1	16	------	2	1	3
Wage earners—							
Average for season	600	16	495	94	105	63	823
Average for year	297	7	241	29	52	22	262
Paid to salaried employees	$6, 110	$1, 020	$30, 916	------	$1, 190	$1, 040	$11, 000
Paid to wage earners	190, 847	4, 735	151, 515	$13, 040	28, 060	11, 680	130, 599
Total salaries and wages	196, 957	5, 755	182, 431	13, 040	29, 250	12, 720	141, 599

Industries related to the fisheries of Virginia, 1930—Continued

WHOLESALE AND MANUFACTURING—Continued

OPERATING UNITS, SALARIES, AND WAGES—Continued

Item	Middlesex County	Norfolk County	Northampton County	Northumberland County	Warwick and York Counties	Total
Establishments	7	15	18	29	8	220
Persons engaged:						
Proprietors	8	24	28	43	10	303
Salaried employees	1	37	4	5	1	78
Wage earners—						
Average for season	127	883	409	791	42	4, 448
Average for year	41	441	153	245	27	1, 817
Paid to salaried employees	$150	$63, 209	$4, 620	$20, 400	$1, 200	$140, 855
Paid to wage earners	22, 348	303, 012	60, 278	138, 335	24, 818	1, 079, 267
Total salaries and wages	22, 498	366, 221	64, 898	158, 735	26, 018	1, 220, 122

PRODUCTS MANUFACTURED

Item	Quantity	Value
Alewives:		
Salted ... pounds	6, 207, 590	$197, 178
Canned ... standard cases	38, 239	114, 540
Roe, canned ... do	36, 677	185, 133
Scrap, dry ... tons	860	41, 004
Oil ... gallons	31, 389	6, 673
Butterfish, pandressed ... pounds	63, 986	7, 610
Croaker:		
Pandressed ... do	858, 705	83, 926
Fresh fillets ... do	23, 000	2, 825
Flounders, pandressed ... do	85, 565	10, 032
Haddock, fresh fillets ... do	249, 581	43, 050
Menhaden:		
Dry scrap and meal ... tons	14, 325	698, 439
Oil ... gallons	1, 682, 733	338, 377
Spot, pandressed ... pounds	34, 445	4, 451
Squeteague:		
Pandressed ... do	802, 309	85, 014
Fresh fillets ... do	213, 435	35, 285
Whiting, pandressed ... do	88, 445	6, 023
Crab meat, packaged (fresh-cooked) ... do	1, 364, 334	510, 562
Oysters:		
Fresh-shucked ... gallons	1, 384, 836	2, 340, 024
Shell products—		
Poultry feed ... tons	18, 519	166, 444
Lime ... do	10, 798	62, 186
Lime, "burned" ... do	9, 847	89, 290
Scallops, bay, fresh-shucked ... gallons	64, 526	84, 967
Unclassified products:		
Packaged [1]	(2)	73, 478
Oil [3] ... gallons	8, 435	1, 847
By-products [4] ... tons	1, 542	39, 742
Total		5, 228, 100

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 479]

Scallops, bay, fresh-shucked ... gallons	136, 000	$100, 000

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[1] Includes fresh cod and shad fillets, pandressed bluefish and haddock, shucked hard clams, and canned crab meat.

[2] Data not available.

[3] From mixed species.

[4] Includes crab scrap and miscellaneous fish scrap and meal.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country: therefore, they can not be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 479 have also been included as fishermen. This fact should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

SHAD AND ALEWIFE FISHERIES OF THE POTOMAC RIVER

The catch of shad in the Potomac River in 1931 amounted to 294,425 roes, and 331,074 bucks, having a combined weight of 2,061,036 pounds, and a total value to the fishermen of $193,505. The catch of alewives for the same season amounted to 18,380,850 in number with a total weight of 7,352,340 pounds, and a value to the fishermen of $55,460. These figures indicate an increase of 243 per cent in the weight and 97 per cent in the value of shad as compared with 1930 and 136 per cent in the weight and 12 per cent in the value of the alewives. About 70 per cent of the shad were taken in pound nets, nearly 30 per cent in gill nets, and the remainder incidentally with haul seines. More than 99 per cent of the alewives were taken in pound nets. The remainder were taken in gill nets and haul seines.

Shad and alewife fisheries of the Potomac River, 1931

Item	Maryland			Virginia			Total		
	Number	Pounds	Value	Number	Pounds	Value	Number	Pounds	Value
Fishermen on boats and shore—									
Regular	51			324			375		
Casual	131			175			306		
Total	182			499			681		
Boats:									
Motor	53			165			218		
Other	55			130			185		
Apparatus:									
Pound nets	64			341			405		
Gill nets	700			764			1, 464		
Square yards	266, 955			215, 190			482, 145		
Haul seines				2			2		
Length, yards				2, 100			2, 100		
Shad caught:									
With pound nets	10, 037	33, 308	$3, 786	428, 528	1, 398, 837	$143, 527	438, 565	1, 432, 145	$147, 313
With gill nets	90, 380	304, 210	20, 645	95, 354	320, 631	25, 220	185, 734	624, 841	45, 865
With haul seines				1, 200	4, 050	327	1, 200	4, 050	327
Total	100, 417	337, 518	24, 431	525, 082	1, 723, 518	169, 074	625, 499	2, 061, 036	193, 505
Alewives caught:									
With pound nets	977, 750	391, 100	3, 851	17, 343, 100	6, 937, 240	51, 204	18, 320, 850	7, 328, 340	55, 055
With gill nets				55, 000	22, 000	385	55, 000	22, 000	385
With haul seines				5, 000	2, 000	20	5, 000	2, 000	20
Total	977, 750	391, 100	3, 851	17, 403, 100	6, 961, 240	51, 609	18, 380, 850	7, 352, 340	55, 460

TRADE IN FRESH, FROZEN, SMOKED, AND PACKAGED FISHERY PRODUCTS IN WASHINGTON, D. C.

The municipal fish wharf and market in Washington, D. C., is located in the southwestern part of the city on an arm of the Potomac River. At the present time 16 fishery firms have stalls in the market, 3 firms are in private buildings across the street, and 4 firms have stalls in the new Center Market. Altogether the 23 above firms employed 120 persons who received $89,542 in salaries and wages during 1931. Of the total employees, 103 were regularly employed. These firms conduct a wholesale and retail business, chiefly wholesale however.

During the year 1931 the receipts of fresh and frozen fishery products as received at the municipal wharf amounted to 9,305,465 pounds. This is an increase of 4 per cent as compared with the year 1930, and an increase of 11 per cent as compared with the 5-year average.

During the year 1931 four firms in Washington, D. C., smoked fishery products which amounted to 268,000 pounds, valued at $27,885. Of this amount, 240,000 pounds valued at $20,950 consisted of herring; 25,050 pounds valued at $6,815 were whitefish while the remainder, 3,000 pounds, valued $120, were alewives or "river herring." There were two firms which shucked oysters mostly for select retail trade. Their production amounted to 7,600 gallons, valued at $16,720. Most of the smoked fish and shucked oysters were marketed in the city.

Fishery products received at municipal fish wharf and market, Washington, D. C., 1931

Species	January	February	March	April	May	June	July
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Alewives (river herring)	14,500	47,400	156,900	302,700	154,800	8,200	---
Black bass	7,600	14,700	29,500	26,400	2,400	6,800	8,200
Bluefish	200	1,400	1,100	400	13,700	9,900	15,700
Butterfish	100	800	1,800	3,800	45,100	60,124	65,700
Carp	16,050	5,200	15,000	5,700	12,700	5,900	2,840
Catfish	5,500	7,500	17,800	18,900	10,100	7,900	700
Cod	1,600	3,200	4,000	2,000	1,000	300	400
Croaker	45,800	41,000	40,500	276,600	193,400	199,900	332,000
Drum, red or redfish	3,500	1,000	---	---	100	440	150
Eels	200	200	200	1,300	1,400	200	---
Flounders	35,800	49,700	53,700	26,600	19,900	10,000	14,800
Gizzard shad	10,900	9,800	2,200	1,400	---	---	---
Haddock	44,160	54,730	75,070	60,660	36,610	29,470	29,730
Hake	200	---	200	1,900	3,500	---	---
Halibut	5,300	4,400	9,300	8,800	5,700	7,300	5,800
Hickory shad or "jacks"	700	6,300	4,900	2,400	100	---	---
Hogfish	---	---	---	500	400	---	---
Kingfish or "king mackerel"	---	---	---	1,600	500	---	---
King whiting or "kingfish"	---	500	600	---	---	---	---
Mackerel	35,400	42,600	32,800	14,100	18,300	25,510	25,900
Mullet	6,600	10,100	1,400	400	---	200	600
Perch	11,150	8,000	25,900	33,000	6,300	2,600	1,200
Pike or pickerel	900	1,100	1,500	1,000	600	800	500
Pollock	1,300	1,300	800	1,000	2,000	2,500	1,200
Pompano	---	600	---	200	---	---	---
Salmon	1,000	3,500	1,800	1,500	3,700	4,700	4,700
Scup or porgy	7,800	26,000	27,700	8,300	3,600	4,200	1,700
Sea bass	---	---	---	---	100	---	---
Shad	34,900	13,800	55,800	234,140	377,600	7,000	---
Sheepshead	---	---	200	---	---	---	---
Skates	---	---	100	---	---	---	---
Smelt	1,200	2,825	4,530	1,200	---	---	---
Snapper, red	200	800	200	200	200	300	100
Spot	1,000	---	---	---	400	10,800	31,400
Squeteagues or "sea trout"	106,400	54,100	37,500	32,900	280,400	235,500	187,000
Striped bass	3,700	4,300	12,800	38,000	8,100	2,500	3,900
Sturgeon	---	---	---	100	150	---	---
Swordfish	---	---	400	---	---	100	500
Tilefish	600	800	500	400	200	---	100
Whitefish	---	100	100	100	---	800	900
Whiting	---	2,800	---	---	---	---	---
Crabs:							
Hard	---	---	---	525	16,425	76,275	103,950
Soft	---	---	---	2,205	12,420	11,745	11,115
Oyster	---	5	---	---	---	---	---
Crab meat	2,000	1,795	2,990	5,925	15,505	25,905	26,730
Lobsters (alive)	150	400	850	4,350	4,050	3,750	1,800
Lobsters (cooked)	---	---	750	---	---	---	---
Lobster meat	---	125	100	190	125	20	325
Shrimp	5,100	6,300	8,600	4,800	8,400	8,300	4,300
Squid	2,900	---	---	---	300	100	---
Clams, hard	5,152	3,968	5,024	6,400	6,944	6,656	7,072
Oysters:							
In the shell (meat)	32,333	17,115	15,393	3,549	21	---	---
Opened (meat)	78,522	64,838	60,401	16,345	---	---	---
Scallops	960	80	560	640	640	280	---
Frogs	---	13	---	84	134	95	15
Terrapin	1,024	144	---	80	---	---	---
Turtles	872	---	144	416	968	620	96
Total	533,273	515,338	711,612	1,153,709	1,268,992	777,690	891,123

Fishery products received at municipal fish wharf and market, Washington, D. C., 1931—Continued

Species	August	September	October	November	December	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Alewives (river herring)						684, 500
Black bass	3, 900	4, 200	4, 300	2, 200	3, 800	114, 000
Bluefish	13, 400	18, 700	34, 300	11, 500	5, 600	125, 900
Butterfish	48, 500	40, 300	41, 100	78, 500	25, 718	411, 542
Carp	1, 500	11, 500	7, 500	8, 000	9, 600	101, 490
Catfish	700	7, 900	15, 300	22, 000	16, 400	130, 700
Cod	500	500	800	1, 000	2, 800	18, 100
Croaker	180, 600	148, 400	76, 300	59, 600	89, 500	1, 683, 600
Drum, red or redfish			30	200		5, 420
Eels		200	1, 500	2, 000	3, 400	10, 600
Flounders	9, 700	17, 100	21, 500	33, 000	29, 900	321, 700
Gizzard shad			400	240	8, 800	33, 740
Haddock	14, 180	16, 270	24, 895	24, 030	32, 300	442, 105
Hake				800	5, 800	12, 400
Halibut	4, 700	5, 900	6, 600	5, 000	3, 600	72, 400
Hickory shad or "jacks"						14, 400
Hogfish	200	200				1, 300
Kingfish or "king mackerel"	600	200		200	4, 400	7, 500
King whiting or "kingfish"			1, 500	2, 600		5, 200
Mackerel	15, 600	19, 400	11, 800	10, 400	14, 200	266, 010
Mullet	400	4, 400	8, 600	11, 900	4, 400	49, 000
Perch	2, 500	5, 400	8, 100	6, 700	10, 800	121, 650
Pike or pickerel	600	2, 000	1, 700	1, 100	500	12, 300
Pollock	2, 400	400	2, 100	1, 200	400	16, 600
Pompano						800
Salmon	2, 400	3, 600	3, 100	3, 100	1, 600	34, 700
Scup or porgy	500	400			1, 200	81, 400
Sea bass						100
Shad						723, 240
Sheepshead				200		400
Skates						100
Smelt				60	705	10, 520
Snapper, red	500	1, 100	400	600	300	4, 900
Spot	51, 200	115, 400	125, 400	15, 800	4, 200	355, 600
Squeteagues or "sea trout"	133, 300	208, 600	278, 600	223, 500	108, 800	1, 886, 600
Striped bass	2, 600	6, 600	22, 900	17, 700	12, 600	135, 700
Sturgeon			80	200		530
Swordfish	600	800	500			2, 900
Tilefish	400			300	200	3, 500
Whitefish	900	1, 900	900	800	600	7, 100
Whiting						2, 800
Crabs:						
Hard	60, 750	51, 450	10, 050	75		319, 500
Soft	12, 195	15, 795	9, 270	135		74, 880
Oyster						5
Crab meat	14, 285	12, 645	11, 450	5, 835	4, 875	129, 940
Sea crawfish or "spiny lobster"				150	50	200
Lobsters (alive)	650	750	2, 850	1, 350	650	21, 600
Lobsters (cooked)						750
Lobster meat	100	30	135	50		1, 200
Shrimp	5, 200	3, 900	7, 900	5, 800	3, 400	72, 000
Squid			100	400	2, 400	6, 200
Clams, hard	6, 720	6, 880	5, 920	3, 552	4, 096	[1] 68, 384
Oysters:						
In the shell (meat)		2, 044	26, 355	50, 442	105, 413	[2] 252, 665
Opened (meat)		2, 686	48, 781	63, 149	98, 411	[3] 433, 133
Scallops	160	240	720	1, 280	1, 080	6, 640
Frogs			12			353
Terrapin			600			1, 848
Turtles	4					3, 120
Total	592, 444	737, 790	824, 348	676, 648	622, 498	9, 305, 465

[1] 8,548 bushels. [2] 36,095 bushels. [3] 49,501 gallons.

NOTE.—The clams have been reduced to pounds on the basis of 8 pounds of meat to a bushel, the oysters on the basis of 7 pounds of meat to a bushel, and 8¾ pounds to a gallon.

FISHERIES OF THE SOUTH ATLANTIC AND GULF STATES[9]

The yield of fishery products in the South Atlantic and Gulf States (North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas) during 1930 amounted to 417,759,466 pounds, valued at $11,064,819. This is a decrease of 22 per cent in the volume of the catch and 26 per cent in its value as compared with the previous year. Of the total catch in 1930, 301,218,657 pounds, valued at $5,277,727, were fish, and 116,540,809 pounds, valued at $5,787,092, were shellfish and miscellaneous products. These fisheries gave employment to 23,590 fishermen or a decrease of 11 per cent as compared with the previous year. Of the total number of fishermen employed during 1930, 3,454 regular fishermen were engaged on vessels and 15,965 regular and 4,171 casual fishermen were employed in the boat and shore fisheries.

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[9] With reference to the figures published in this section the reader should refer to that section in the latter part of the book entitled "Statistical survey procedure" which gives in detail methods for collecting statistics, compilation practices, and conversion factors. This is most necessary for a complete understanding of the statistics presented herewith.

Fisheries of the South Atlantic and Gulf States, 1930

SUMMARY OF CATCH

Product	North Carolina		South Carolina		Georgia	
	Pounds	Value	Pounds	Value	Pounds	Value
Fish	163, 145, 785	$1, 469, 682	1, 017, 836	$83, 337	25, 610, 484	$181, 160
Shellfish, etc	5, 792, 920	366, 799	4, 087, 761	169, 522	9, 262, 037	355, 134
Total	168, 938, 705	1, 836, 481	5, 105, 597	252, 859	34, 872, 521	536, 294

Product	Florida		Alabama		Mississippi	
	Pounds	Value	Pounds	Value	Pounds	Value
Fish	99, 740, 175	$2, 829, 759	3, 761, 479	$192, 423	1, 671, 153	$87, 787
Shellfish, etc	20, 674, 961	1, 815, 993	3, 351, 760	123, 045	14, 064, 377	652, 347
Total	120, 415, 136	4, 645, 752	7, 113, 239	315, 468	15, 735, 530	740, 134

Product	Louisiana		Texas		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Fish	1, 954, 586	$114, 678	4, 317, 159	$318, 901	301, 218, 657	$5, 277, 727
Shellfish, etc	47, 931, 314	1, 845, 679	11, 375, 679	458, 573	116, 540, 809	5, 787, 092
Total	49, 885, 900	1, 960, 357	15, 692, 838	777, 474	417, 759, 466	11, 064, 819

OPERATING UNITS: BY STATES

Item	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	1, 159	39	144	867	142	555	370	178	3, 454
On boats and shore—									
Regular	2, 693	705	371	6, 176	469	1, 355	2, 775	1, 421	15, 965
Casual	1, 353	756	472	737	55	193	238	367	4, 171
Total	5, 205	1, 500	987	7, 780	666	2, 103	3, 383	1, 966	23, 590
Vessels:									
Steam			3						3
Net tonnage			166						166
Motor	110	10	24	98	30	125	148	44	589
Net tonnage	2, 140	124	195	3, 174	335	1, 678	1, 074	535	9, 255
Sail	67			6		5			78
Net tonnage	631			527		66			1, 224
Total vessels	177	10	27	104	30	130	148	44	670
Total net tonnage	2, 771	124	361	3, 701	335	1, 744	1, 074	535	10, 645

Fisheries of the South Atlantic and Gulf States, 1930—Continued

OPERATING UNITS: BY STATES—Continued

Item	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Boats:									
Motor	1,375	51	178	2,332	185	401	997	431	5,950
Other	1,586	969	421	3,220	183	615	1,073	498	8,565
Accessory boats	123	--------	12	21	13	--------	--------	------	169
Apparatus:									
Purse seines—									
Menhaden	52	--------	3	17	------	--------	--------	------	72
Length, yards	13,335	--------	900	4,960	------	--------	--------	------	19,195
Other	4	--------	--------	2	------	--------	--------	------	6
Length, yards	700	--------	--------	600	------	--------	--------	------	1,300
Haul seines—									
Common	580	21	16	173	8	45	138	63	1,044
Length, yards	80,708	3,535	1,850	64,220	5,900	9,220	27,875	11,250	204,558
Long	87	--------	--------	80	------	--------	--------	------	167
Length, yards	84,650	--------	--------	64,200	------	--------	--------	------	148,850
Gill nets—									
Anchor	2,529	282	27	42	------	--------	--------	2	2,882
Square yards	1,287,852	82,000	6,090	25,200	------	--------	--------	2,000	1,40 ,142
Drift	170	157	146	212	------	--------	--------	------	685
Square yards	172,203	160,790	275,045	330,450	------	--------	--------	------	938,488
Runaround	426	27	45	2,213	------	--------	1	102	2,814
Square yards	198,979	13,000	14,310	2,812,854	------	--------	30	23,854	3,063,027
Stake	11,229	--------	105	2	------	--------	--------	383	11,719
Square yards	741,300	--------	54,540	1,080	------	--------	--------	95,294	892,214
Trammel nets	--------	--------	--------	180	84	55	50	80	449
Square yards	--------	--------	--------	129,568	28,692	17,785	13,712	26,651	216,408
Lines—									
Hand	98	127	8	1,579	149	167	147	459	2,734
Hooks	396	460	16	2,809	271	201	152	678	4,983
Troll	15	--------	--------	1,309	2	--------	--------	8	1,334
Hooks	15	--------	--------	1,814	2	--------	--------	8	1,839
Trot, with baits or snoods	177	6	6	8	14	66	288	33	598
Baits or snoods	122,800	4,800	1,950	1,700	2,475	20,795	58,370	4,300	217,190
Trot, with hooks	14	--------	68	241	177	--------	3	36	539
Hooks	840	--------	3,400	106,740	17,900	--------	300	5,500	134,680
Pound nets	2,343	--------	--------	52	------	--------	--------	------	2,395
Weirs	4	--------	--------	--------	------	--------	--------	------	4
Wheels	50	--------	--------	--------	------	--------	--------	------	50
Fyke nets	847	--------	60	2,950	119	--------	--------	------	3,976
Dip nets—									
Common	244	10	--------	62	------	--------	--------	------	316
Drop	--------	--------	--------	31	------	232	1,700	------	1,963
Cast nets	--------	--------	40	44	------	54	3	------	141
Otter trawls—									
Fish	4	--------	--------	--------	------	--------	--------	------	4
Yards at mouth	74	--------	--------	--------	------	--------	--------	------	74
Shrimp	52	36	182	327	138	363	940	264	2,302
Yards at mouth	908	675	3,774	5,689	1,800	4,607	12,213	3,855	33,521
Box traps	10	--------	--------	--------	------	--------	--------	------	10
Wire baskets	--------	--------	--------	520	------	--------	--------	------	520
Turtle traps	30	--------	--------	--------	------	--------	--------	------	30
Pots—									
Crab	--------	--------	30	1,383	------	--------	--------	------	1,413
Eel	1,502	--------	--------	90	------	--------	--------	------	1,592
Sea crawfish	--------	--------	--------	2,533	------	--------	--------	------	2,533
Spears	54	30	--------	26	21	76	--------	175	382
Dredges—									
Clam	--------	--------	--------	1	------	--------	72	------	73
Yards at mouth	--------	--------	--------	--------	------	--------	72	------	72
Crab	80	--------	--------	--------	------	--------	--------	------	80
Yards at mouth	107	--------	--------	--------	------	--------	--------	------	107
Oyster	243	2	--------	--------	------	437	--------	38	720
Yards at mouth	241	3	--------	--------	------	443	--------	37	724
Scallop	328	--------	--------	2	------	--------	--------	------	330
Yards at mouth	318	--------	--------	2	------	--------	--------	------	320
Tongs	480	77	108	420	116	440	526	330	2,497
Rakes	643	47	6	--------	------	--------	--------	------	696
Forks	--------	--------	--------	58	------	--------	--------	------	58
Grabs	--------	501	84	--------	------	--------	--------	------	585
Hooks—									
Sea crawfish and stone crab	--------	--------	--------	2,000	------	--------	--------	------	2,000
Sponge	--------	--------	--------	283	------	--------	--------	------	283
Diving apparatus	--------	--------	--------	55	------	--------	--------	------	55

Fisheries of the South Atlantic and Gulf States, 1930—Continued

CATCH: BY STATES

Species	North Carolina		South Carolina		Georgia	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Alewives	9, 838, 727	$68, 308	2, 000	$10	--------	--------
Black bass	106, 413	15, 545	--------	--------	--------	--------
Bluefish	842, 935	41, 781	100	10	1, 012	$227
Bonito	18, 850	470	--------	--------	--------	--------
Bowfin	19, 230	568	--------	--------	--------	--------
Butterfish	182, 560	4, 301	--------	--------	--------	--------
Carp	470, 189	32, 409	--------	--------	--------	--------
Catfish and bullheads	460, 072	20, 307	2, 000	40	228, 000	7, 100
Cero	9, 000	680	--------	--------	--------	--------
Cod	1, 200	45	--------	--------	--------	--------
Crappie	650	110	--------	--------	--------	--------
Croaker	5, 108, 310	75, 419	2, 000	60	15, 500	310
Drum:						
Black	--------	--------	500	25	1, 000	30
Red or redfish	145, 050	2, 474	8, 350	466	5, 250	210
Eels	142, 260	10, 787	--------	--------	--------	--------
Flounders	349, 800	17, 458	30, 025	2, 266	8, 800	613
Garfish	100	6	--------	--------	--------	--------
Gizzard shad	38, 991	614	--------	--------	--------	--------
Groupers	--------	--------	--------	--------	7, 354	441
Grunts	18, 000	360	8, 000	640	390	32
Harvestfish or "starfish"	343, 300	10, 111	--------	--------	--------	--------
Hickory shad	323, 960	13, 857	7, 500	330	25, 500	2, 010
Jewfish	--------	--------	--------	--------	4, 629	232
King whiting or "kingfish"	272, 350	11, 165	38, 080	3, 451	38, 250	1, 463
Menhaden	134, 051, 240	535, 631	--------	--------	24, 701, 250	94, 100
Mullet	2, 386, 350	91, 434	412, 000	20, 972	176, 800	9, 795
Pigfish	94, 200	1, 596	725	22	--------	--------
Pike or pickerel	9, 970	1, 137	--------	--------	--------	--------
Pinfish or sailors choice	31, 900	480	2, 000	80	--------	--------
Pompano	8, 600	907	100	15	--------	--------
Porgies	1, 000	30	100	8	--------	--------
Sea bass	173, 250	7, 975	197, 250	15, 587	22, 840	2, 085
Shad	1, 172, 161	209, 989	214, 492	32, 365	274, 755	54, 751
Sharks	--------	--------	10, 000	200	--------	--------
Sheepshead	11, 615	585	100	10	700	42
Skates	--------	--------	1, 000	50	--------	--------
Snappers:						
Mangrove	--------	--------	3, 000	240	200	16
Red	4, 750	195	--------	--------	29, 854	2, 462
Spadefish	430	17	--------	--------	--------	--------
Spanish mackerel	131, 165	11, 776	--------	--------	--------	--------
Spot	2, 326, 790	38, 334	28, 300	669	11, 950	219
Squeteagues or "sea trout":						
Gray	2, 333, 127	82, 613	24, 000	1, 720	3, 000	130
Spotted	694, 309	58, 271	10, 900	1, 090	48, 450	3, 892
Squirrelfish	150	6	350	18	--------	--------
Striped bass	456, 876	60, 550	--------	--------	500	100
Sturgeon	2, 600	840	14, 964	2, 993	4, 500	900
Suckers	15, 650	724	--------	--------	--------	--------
Sunfish	8, 797	185	--------	--------	--------	--------
Tripletail	500	19	--------	--------	--------	--------
White perch	442, 208	32, 992	--------	--------	--------	--------
Yellow perch	96, 200	6, 621	--------	--------	--------	--------
Total	163, 145, 785	1, 469, 682	1, 017, 836	83, 337	25, 610, 484	181, 160
SHELLFISH, ETC.						
Crabs: [1]						
Hard	1, 159, 500	18, 995	26, 000	780	228, 000	4, 560
Soft	378, 580	57, 068	--------	--------	--------	--------
Stone	350	11	--------	--------	--------	--------
Shrimp	1, 298, 610	40, 752	792, 733	31, 814	8, 852, 712	334, 576
Clams, hard, public [2]	316, 720	40, 680	11, 200	1, 400	2, 240	350
Oysters: [3]						
Market, public, spring	1, 166, 258	72, 725	1, 742, 057	58, 887	29, 978	2, 740
Market, public, fall	1, 039, 416	82, 423	683, 960	25, 914	21, 161	1, 440
Market, private, spring	--------	--------	546, 078	33, 363	50, 709	3, 423
Market, private, fall	--------	--------	276, 414	14, 988	57, 537	3, 005
Scallops, bay	431, 826	53, 923	--------	--------	--------	--------
Octopus	1, 000	150	3, 500	290	--------	--------
Terrapin, diamond-back	90	45	5, 819	2, 086	19, 700	5, 040

See footnotes at end of table.

Fisheries of the South Atlantic and Gulf States, 1930—Continued

CATCH: BY STATES—Continued

Species	North Carolina		South Carolina		Georgia	
	Pounds	Value	Pounds	Value	Pounds	Value
SHELLFISH, ETC.—continued						
Turtles:						
Loggerhead	70	$2	----------	----------	----------	----------
Snappers	500	25	----------	----------	----------	----------
Total	5, 792, 920	366, 799	4, 087, 761	$169, 522	9, 262, 037	$355, 134
Grand total	168, 938, 705	1, 836, 481	5, 105, 597	252, 859	34, 872, 521	536, 294

Species	Florida		Alabama		Mississippi	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Alewives	365, 732	$5, 486	----------	----------	----------	----------
Amberjack	21, 220	667	----------	----------	----------	----------
Black bass	333, 086	31, 615	----------	----------	----------	----------
Bluefish	1, 153, 547	65, 954	20, 654	$926	19, 191	$1, 047
Blue runner or hardtail	754, 245	14, 000	2, 205	63	----------	----------
Bonito	1, 190	24	----------	----------	----------	----------
Buffalofish	----------	----------	100, 855	5, 503	14, 969	680
Cabio or crab eater	10, 307	437	2, 200	100	1, 837	98
Catfish and bullheads	4, 346, 231	192, 912	90, 904	6, 001	61, 422	2, 792
Cero	9, 950	480	----------	----------	----------	----------
Cigarfish	58, 412	1, 752	----------	----------	----------	----------
Crappie	898, 976	34, 389	----------	----------	----------	----------
Crevalle	90, 356	2, 459	2, 558	70	9, 957	272
Croaker	33, 020	735	7, 447	247	11, 275	397
Dolphin	5, 000	500	----------	----------	----------	----------
Drum:						
Black	34, 624	893	11, 693	569	20, 755	972
Red or redfish	1, 023, 884	34, 033	104, 334	6, 107	122, 030	6, 721
Eels	17, 143	856	----------	----------	----------	----------
Flounders	119, 611	6, 252	24, 180	1, 960	68, 989	6, 001
Groupers	3, 064, 802	92, 194	177, 945	5, 338	71, 093	2, 133
Grunts	21, 883	657	----------	----------	----------	----------
Hickory shad	29, 616	888	----------	----------	----------	----------
Hogfish	2, 000	100	----------	----------	----------	----------
Jewfish	26, 050	782	5, 021	151	1, 274	38
Kingfish or "king mackerel"	3, 685, 865	175, 006	----------	----------	----------	----------
King whiting or "kingfish"	153, 133	5, 165	5, 798	199	5, 604	183
Menhaden	40, 414, 170	176, 446	----------	----------	----------	----------
Mojarro	81, 275	2, 508	----------	----------	----------	----------
Mullet	22, 021, 806	669, 468	2, 205, 378	86, 007	801, 755	32, 120
Muttonfish	225, 039	15, 446	----------	----------	----------	----------
Paddlefish or spoonbill cat	----------	----------	2, 251	125	----------	----------
Permit	14, 882	449	----------	----------	----------	----------
Pigfish	62, 155	1, 601	----------	----------	----------	----------
Pinfish or sailors choice	78, 050	1, 524	----------	----------	----------	----------
Pompano	573, 353	111, 716	5, 062	790	791	228
Porgies	55, 033	1, 643	----------	----------	----------	----------
Porkfish	600	36	----------	----------	----------	----------
Sea bass	48, 640	3, 206	----------	----------	----------	----------
Shad	879, 732	129, 014	----------	----------	----------	----------
Sharks	2, 187, 500	3, 500	----------	----------	----------	----------
Sheepshead	872, 133	29, 768	17, 569	988	30, 517	1, 735
Snappers:						
Mangrove	121, 820	4, 847	----------	----------	----------	----------
Red	5, 035, 702	427, 140	847, 918	67, 833	188, 725	15, 875
Snook or sergeantfish	368, 109	11, 275	----------	----------	----------	----------
Spadefish	48, 561	1, 445	110	3	----------	----------
Spanish mackerel	6, 140, 217	294, 175	5, 808	338	1, 355	88
Spot	142, 556	4. 012	1, 561	66	----------	----------
Squeteagues or "sea trout":						
Gray	599, 200	43, 355	6, 587	246	107, 167	3, 720
Spotted	2, 790, 566	202, 541	105, 981	8, 268	125, 112	12, 344
Sturgeon	8, 410	1, 259	1, 816	297	73	22
Sunfish	434, 183	13, 043	----------	----------	----------	----------
Tenpounder	181, 361	5, 213	5, 369	215	4, 725	142
Tripletail	4, 869	168	275	13	2, 537	179
Turbot	900	54	----------	----------	----------	----------
Yellowtail	89, 470	6, 671	----------	----------	----------	----------
Total	99, 740, 175	2, 829, 759	3, 761, 479	192, 423	1, 671, 153	87, 787

Fisheries of the South Atlantic and Gulf States, 1930—Continued

CATCH: BY STATES—Continued

Species	Florida		Alabama		Mississippi	
	Pounds	Value	Pounds	Value	Pounds	Value
SHELLFISH, ETC.						
Crabs: [1]						
Hard	111, 295	$4, 103	79, 968	$1, 142	$673, 281	$11, 129
Soft			780	195	5, 800	1, 740
Stone	307, 550	26, 630				
Sea crawfish or spiny lobster	288, 309	26, 731				
Shrimp	16, 848, 576	635, 506	2, 982, 200	97, 219	8, 489, 050	318, 871
Clams: [2]						
Hard, public	687, 888	44, 540				
Hard, private	23, 688	1, 890				
Conchs	20, 000	200				
Oysters: [3]						
Market, public, spring	790, 168	51, 468	40, 144	3, 755	3, 959, 190	260, 061
Market, public, fall	878, 242	81, 104	225, 506	17, 723	937, 056	60, 546
Market, private, spring	35, 545	3, 063	4, 080	480		
Market, private, fall	79, 298	6, 563	17, 064	1, 896		
Scallops, bay	21, 867	2, 139				
Terrapin, diamond-back	406	83	2, 018	635		
Turtles:						
Green	21, 550	1, 078				
Soft-shell	11, 578	235				
Sponges:						
Grass	82, 918	26, 556				
Sheepswool	370, 465	858, 699				
Velvet	682	409				
Wire	3, 781	2, 041				
Yellow	91, 155	42, 955				
Total	20, 674, 961	1, 815, 993	3, 351, 760	123, 045	14, 064, 377	652, 347
Grand total	120, 415, 136	4, 645, 752	7, 113, 239	315, 468	15, 735, 530	740, 134

Species	Louisiana		Texas		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Alewives					10, 206, 459	$73, 804
Amberjack					21, 220	667
Black bass					439, 499	47, 160
Bluefish			165	$14	2, 037, 604	109, 959
Blue runner or hardtail					756, 450	14, 063
Bonito					20, 040	494
Bowfin					19, 230	568
Buffalofish					115, 824	6, 183
Butterfish					182, 560	4, 301
Cabio or crab eater					14, 344	635
Carp					470, 189	32, 409
Catfish and bullheads	89, 143	$3, 213	97, 572	4, 380	5, 375, 344	236, 745
Cero					18, 950	1, 160
Cigarfish					58, 412	1, 752
Cod					1, 200	45
Crappie					899, 626	34, 499
Crevalle	165	15	154	4	103, 190	2, 820
Croaker	59, 863	4, 205	31, 913	1, 095	5, 269, 328	82, 468
Dolphin					5, 000	500
Drum:						
Black	166, 436	6, 451	1, 051, 968	33, 656	1, 286, 976	42, 596
Red or redfish	334, 882	25, 959	872, 597	72, 446	2, 616, 377	148, 416
Eels					159, 403	11, 643
Flounders	23, 067	2, 083	71, 297	7, 083	695, 769	43, 716
Garfish	1, 320	120			1, 420	126
Gizzard shad					38, 991	614
Groupers	3, 500	105	20, 855	630	3, 345, 549	100, 841
Grunts					48, 273	1, 689
Harvestfish or "starfish"					343, 300	10, 111
Hickory shad					386, 576	17, 085
Hogfish					2, 000	100
Jewfish	6, 000	180	1, 430	56	44, 404	1, 439
Kingfish or "king mackerel"			3, 080	120	3, 688, 945	175, 126
King whiting or "kingfish"	54, 367	1, 704	15, 730	572	583, 312	23, 902
Menhaden					199, 166, 660	806, 177
Mojarro					81, 275	2, 508
Mullet	8, 972	311	7, 921	232	28, 020, 982	910, 339
Muttonfish					225, 039	15, 446
Paddlefish or spoonbill cat					2, 251	125
Permit					14, 882	449
Pigfish					157, 080	3, 219
Pike or pickerel					9, 970	1, 137

See footnotes at end of table.

Fisheries of the South Atlantic and Gulf States, 1930—Continued

CATCH: BY STATES—Continued

Species	Louisiana		Texas		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH—continued						
Pinfish or sailors choice					111,950	$2,084
Pompano	1,112	$301	13,010	$2,963	602,028	116,920
Porgies					56,133	1,681
Porkfish					600	36
Sea bass					441,980	28,853
Shad					2,541,140	426,119
Sharks	300,000	1,400			2,497,500	5,100
Sheepshead	102,124	5,993	42,251	1,933	1,077,009	41,054
Skates					1,000	50
Snappers:						
Mangrove					125,020	5,103
Red	76,400	6,112	929,578	75,385	7,112,927	595,002
Snook or sergeantfish			39,446	2,816	407,555	14,091
Spadefish			550	20	49,651	1,485
Spanish mackerel	1,800	108	74,289	4,176	6,354,634	310,661
Spot	9,704	290			2,520,861	43,590
Squeteagues or "sea trout".						
Gray	323,329	9,809			3,396,410	141,593
Spotted	387,101	45,864	1,043,353	111,320	5,205,772	443,590
Squirrelfish					500	24
Striped bass					457,376	60,650
Sturgeon					32,363	6,311
Suckers					15,650	724
Sunfish					442,980	13,228
Tenpounder					191,455	5,570
Tripletail	5,301	455			13,482	834
Turbot					900	54
White perch					442,208	32,992
Yellow perch					96,200	6,621
Yellowtail					89,470	6,671
Total	1,954,586	114,678	4,317,159	318,901	301,218,657	5,277,727
SHELLFISH, ETC.						
Crabs: [1]						
Hard	4,185,995	63,457	29,046	1,063	6,493,085	105,229
Soft	145,732	58,068			530,892	117,071
Stone					307,900	26,641
Sea crawfish or spiny lobster					288,309	26,731
Shrimp	38,664,487	1,159,626	10,189,318	377,016	88,117,686	2,995,380
Clams: [2]						
Hard, public					1,018,048	86,970
Hard, private					23,688	1,890
Conchs					20,000	200
Oysters: [3]						
Market, public, spring	271,464	11,751	515,752	35,888	8,515,011	497,275
Market, public, fall	406,668	24,940	633,819	43,396	4,825,828	337,486
Market, private, spring	1,797,832	201,657	3,040	475	2,437,284	242,461
Market, private, fall	2,370,336	311,698	4,704	735	2,805,353	338,885
Scallops, bay					453,693	56,062
Octopus					4,500	440
Terrapin, diamond-back	38,750	12,980			66,783	20,869
Turtles:						
Green					21,550	1,078
Loggerhead	50,050	1,502			50,120	1,504
Snappers					500	25
Soft-shell					11,578	235
Sponges:						
Grass					82,918	26,556
Sheepswool					370,465	858,699
Velvet					682	409
Wire					3,781	2,041
Yellow					91,155	42,955
Total	47,931,314	1,845,679	11,375,679	458,573	116,540,809	5,787,092
Grand total	49,885,900	1,960,357	15,692,838	777,474	417,759,466	11,064,819

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[1] Statistics on hard crabs used in this table are based on 4 pounds per dozen in North Carolina, South Carolina, and Georgia; 6.45 pounds in Florida; 7 pounds in Alabama, Mississippi, and Texas; and 6.34 pounds in Louisiana. In reports for previous years, hard crabs in these States have been computed at 4 pounds per dozen.

[2] Statistics on hard clams used in this table are based on 8 pounds of meats per bushel in Florida, and 10 pounds in the other States. In reports for previous years, all hard clams in these States have been computed on the basis of a uniform yield of 8 pounds of meats to the bushel.

[3] Statistics on market oysters used in this table are based on yields of 5.36 pounds of meats per bushel in North Carolina, 4.61 pounds in South Carolina, 4.41 pounds in Georgia, 3.34 pounds in Florida, 3.23 pounds in Alabama, 1.91 pounds in Mississippi, 3.99 pounds in Louisiana, and 4.65 pounds in Texas. In reports for previous years, all oysters have been computed on the basis of a uniform yield of 7 pounds of meats to the bushel.

Fisheries of the South Atlantic and Gulf States, 1930—Continued

PRODUCTION OF CERTAIN SHELLFISH IN NUMBERS AND BUSHELS

Product	North Carolina		South Carolina		Georgia	
	Quantity	Value	Quantity	Value	Quantity	Value
Crabs:						
Hard.....number	3, 478, 500	$18, 995	78, 000	$780	684, 000	$4, 560
Soft.....do	1, 135, 740	57, 068	------	------	------	------
Clams, hard, public.....bushels	31, 672	40, 680	1, 120	1, 400	224	350
Oysters:						
Market, public, spring.....do	217, 505	72, 725	377, 870	58, 887	6, 800	2, 740
Market, public, fall.....do	193, 849	82, 423	148, 358	25, 914	4, 800	1, 440
Market, private, spring.....do	------	------	118, 450	33, 363	11, 502	3, 423
Market, private, fall.....do	------	------	59, 957	14, 988	13, 051	3, 005
Scallops, bay.....do	71, 971	53, 923	------	------	------	------

Product	Florida		Alabama		Mississippi	
	Quantity	Value	Quantity	Value	Quantity	Value
Crabs:						
Hard.....number	206, 988	$4, 103	137, 088	$1, 142	1, 154, 196	$11, 129
Soft.....do	------	------	2, 340	195	17, 400	1, 740
Clams:						
Hard, public.....bushels	85, 986	44, 540	------	------	------	------
Hard, private.....do	2, 961	1, 890	------	------	------	------
Oysters:						
Market, public, spring.....do	236, 577	51, 468	12, 440	3, 755	2, 070, 706	260, 061
Market, public, fall.....do	263, 096	81, 104	69, 881	17, 723	490, 092	60, 546
Market, private, spring.....do	10, 672	3, 063	1, 264	480	------	------
Market, private, fall.....do	23, 742	6, 563	5, 288	1, 896	------	------
Scallops, bay.....do	3, 644	2, 139	------	------	------	------

Product	Louisiana		Texas		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
Crabs:						
Hard.....number	7, 794, 780	$63, 457	49, 785	$1, 063	13, 583, 337	$105, 229
Soft.....do	437, 196	58, 068	------	------	1, 592, 676	117, 071
Clams:						
Hard, public.....bushels	------	------	------	------	119, 002	86, 970
Hard, private.....do	------	------	------	------	2, 961	1, 890
Oysters:						
Market, public, spring.....do	68, 087	11, 751	110, 938	35, 888	3, 100, 923	497, 275
Market, public, fall.....do	101, 998	24, 940	136, 334	43, 396	1, 408, 408	337, 486
Market, private, spring.....do	450, 924	201, 657	654	475	593, 466	242, 461
Market, private, fall.....do	594, 516	311, 698	1, 012	735	697, 566	338, 885
Scallops, bay.....do	------	------	------	------	75, 615	56, 062

Industries related to the fisheries of the South Atlantic and Gulf States, 1930

Item	North Carolina	South Carolina	Georgia	Florida	Alabama
Transporting:					
Persons engaged—	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	54	184		51	12
On boats	5	7		47	18
Total	59	191		98	30
Vessels—					
Motor	33	13		24	6
Net tonnage	315	138		379	55
Sail		40		3	
Net tonnage		368		41	
Total vessels	33	53		27	6
Total net tonnage	315	506		420	55
Boats	3	33		41	3
Wholesale and manufacturing:					
Establishments	71	32	29	224	21
Persons engaged—					
Proprietors	90	30	25	279	31
Salaried employees	26	27	27	106	16
Wage earners:					
Average for season	1,052	1,327	1,090	1,837	492
Average for year	305	491	407	861	218
Salaries and wages paid	$233,924	$259,398	$253,445	$900,298	$138,240
Manufactured products [1]	$836,751	$882,538	$629,668	$1,995,751	$329,990
Fishermen's manufactured products:					
Persons engaged	417	37		240	46
Products	$130,219	$28,937		$46,277	$7,699

Item	Mississippi	Louisiana	Texas	Total
Transporting:				
Persons engaged—	*Number*	*Number*	*Number*	*Number*
On vessels		133	3	437
On boats	26	246		349
Total	26	379	3	786
Vessels—				
Motor		65	1	142
Net tonnage		525	6	1,418
Sail				43
Net tonnage				409
Total vessels		65	1	185
Total net tonnage		525	6	1,827
Boats	13	128		221
Wholesale and manufacturing:				
Establishments	53	102	55	587
Persons engaged—				
Proprietors	72	133	66	726
Salaried employees	37	100	35	374
Wage earners:				
Average for season	2,546	3,821	1,370	13,535
Average for year	1,056	1,783	727	5,848
Salaries and wages paid	$475,692	$938,868	$264,176	$3,464,041
Manufactured products [1]	$2,141,119	$4,618,333	$886,255	$12,320,405
Fishermen's manufactured products:				
Persons engaged	61		210	1,011
Products	$9,658		$42,375	$265,165

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[1] These production figures are not comparable with those shown in previous bulletins since packaged fresh and frozen fishery products are now included.

NOTE.—Of the total number of persons employed on transporting craft, 408 have also been included as fishermen, and among the total persons engaged in the preparation of fishermen's manufactured products, 904 have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

NORTH CAROLINA

Fisheries of North Carolina, 1930

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines		Gill nets			
	Menhaden	Other	Common	Long	Anchor	Drift	Run-around	Stake
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	734	--------	18	138	81	--------	--------	--------
On boats and shore—								
Regular	56	28	1,092	308	310	189	193	324
Casual	8	--------	500	19	93	20	117	97
Total	798	28	1,610	465	484	209	310	421
Vessels:								
Motor—								
5 to 10 tons	8	--------	6	34	15	--------	--------	--------
11 to 20 tons	5	--------	--------	2	1	--------	--------	--------
21 to 30 tons	3	--------	--------	--------	--------	--------	--------	--------
31 to 40 tons	10	--------	--------	--------	--------	--------	--------	--------
41 to 50 tons	6	--------	--------	--------	--------	--------	--------	--------
51 to 60 tons	6	--------	--------	--------	--------	--------	--------	--------
61 to 70 tons	3	--------	--------	--------	--------	--------	--------	--------
71 to 80 tons	2	--------	--------	--------	--------	--------	--------	--------
81 to 90 tons	1	--------	--------	--------	--------	--------	--------	--------
Total	44	--------	6	36	16	--------	--------	--------
Net tonnage	1,634	--------	37	249	114	--------	--------	--------
Boats:								
Motor	8	4	241	93	176	81	84	219
Other	--------	8	540	55	140	75	137	123
Accessory boats	104	--------	2	15	--------	--------	--------	--------
Apparatus:								
Number	52	4	580	87	2,529	170	426	11,229
Length, yards	13,335	700	80,708	84,650	--------	--------	--------	--------
Square yards	--------	--------	--------	--------	1,287,852	172,203	198,979	741,300

Item	Lines				Pound nets	Weirs	Wheels	Fyke nets	Dip nets, common	Otter trawls	
	Hand	Troll	Trot, with baits or snoods	Trot, with hooks						Fish	Shrimp
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	15	------	------	------	------	------	------	------	------	12	10
On boats and shore—											
Regular	4	15	104	8	499	1	6	42	133	------	92
Casual	40	------	72	1	207	------	10	11	111	------	2
Total	59	15	176	9	706	1	16	53	244	12	104
Vessels:											
Motor—											
5 to 10 tons	4	------	------	------	------	------	------	------	------	------	5
11 to 20 tons	------	------	------	------	------	------	------	------	------	3	------
21 to 30 tons	------	------	------	------	------	------	------	------	------	1	------
Total	4	------	------	------	------	------	------	------	------	4	5
Net tonnage	29	------	------	------	------	------	------	------	------	70	38
Boats:											
Motor	12	15	99	------	285	1	6	33	10	------	47
Other	10	------	60	9	248	------	20	27	202	------	------
Accessory boats	2	------	------	------	------	------	------	------	------	------	------
Apparatus:											
Number	98	15	177	14	2,343	4	50	847	244	4	52
Yards at mouth	------	------	------	------	------	------	------	------	------	74	908
Hooks, baits, or snoods	396	15	122,800	840	------	------	------	------	------	------	------

Fisheries of North Carolina, 1930—Continued

OPERATING UNITS: By gear—Continued

Item	Box traps	Turtle traps	Pots, eel	Spears	Dredges			Tongs	Rakes	By hand	Total, exclusive of duplication
					Crab	Oyster	Scallop				
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:											
On vessels	------	------	------	------	------	220	------	3	------	------	1,159
On boats and shore—											
Regular	------	1	34	6	40	65	155	216	271	100	2,693
Casual	10	------	20	48	------	41	29	261	327	95	1,353
Total	10	1	54	54	40	326	184	480	598	195	5,205
Vessels:											
Motor—											
5 to 10 tons	------	------	------	------	------	7	------	------	------	------	67
11 to 20 tons	------	------	------	------	------	1	------	------	------	------	11
21 to 30 tons	------	------	------	------	------	------	------	------	------	------	4
31 to 40 tons	------	------	------	------	------	------	------	------	------	------	10
41 to 50 tons	------	------	------	------	------	------	------	------	------	------	6
51 to 60 tons	------	------	------	------	------	------	------	------	------	------	6
61 to 70 tons	------	------	------	------	------	------	------	------	------	------	3
71 to 80 tons	------	------	------	------	------	------	------	------	------	------	2
81 to 90 tons	------	------	------	------	------	------	------	------	------	------	1
Total	------	------	------	------	------	8	------	------	------	------	110
Net tonnage	------	------	------	------	------	68	------	------	------	------	2,140
Sail—											
5 to 10 tons	------	------	------	------	------	49	------	1	------	------	50
11 to 20 tons	------	------	------	------	------	14	------	------	------	------	14
21 to 30 tons	------	------	------	------	------	3	------	------	------	------	3
Total	------	------	------	------	------	66	------	1	------	------	67
Net tonnage	------	------	------	------	------	624	------	7	------	------	631
Total vessels	------	------	------	------	------	74	------	1	------	------	177
Total net tonnage	------	------	------	------	------	692	------	7	------	------	2,771
Boats:											
Motor	4	1	16	------	40	39	134	192	58	------	1,375
Other	4	------	35	54	------	26	10	201	441	80	1,586
Accessory boats	------	------	------	------	------	------	------	------	------	------	123
Apparatus:											
Number	10	30	1,502	54	80	243	328	480	643	------	------
Yards at mouth	------	------	------	------	107	241	318	------	------	------	------

CATCH: By gear

Species	Purse seines				Haul seines			
	Menhaden		Other		Common		Long	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	------	------	------	------	1,998,727	$10,208	164,900	$1,148
Black bass	------	------	------	------	56,143	8,005	32,770	4,915
Bluefish	------	------	------	------	198,650	10,631	120,200	4,993
Bonito	------	------	------	------	7,850	237	------	------
Bowfin	------	------	------	------	4,929	123	2,301	52
Butterfish	------	------	------	------	2,600	90	3,385	915
Carp	------	------	------	------	182,225	12,622	123,864	9,089
Catfish and bullheads	------	------	------	------	91,350	3,082	59,322	2,305
Cod	------	------	------	------	400	8	------	------
Croaker	------	------	------	------	733,000	10,080	2,024,760	32,225
Drum, red or redfish	------	------	------	------	21,800	472	91,050	1,328
Eels	------	------	------	------	100	7	1,610	125
Flounders	------	------	------	------	35,450	1,668	13,800	709
Gizzard shad	------	------	------	------	5,900	113	7,591	124
Harvestfish	------	------	------	------	15,750	420	170,500	5,420
Hickory shad	------	------	------	------	45,710	1,517	8,000	280
King whiting or "kingfish"	------	------	------	------	70,050	2,723	13,800	482
Menhaden	133,656,440	$534,478	------	------	------	------	394,800	1,153
Mullet	79,010	2,288	------	------	923,240	36,160	277,200	3,496
Pigfish	------	------	------	------	7,500	151	71,700	1,199

Fisheries of North Carolina, 1930—Continued

CATCH: BY GEAR—Continued

Species	Purse seines				Haul seines			
	Menhaden		Other		Common		Long	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Pike or pickerel					4, 330	$472	1, 190	$145
Pinfish							30, 000	450
Pompano					900	128	2, 200	221
Porgies					1, 000	30		
Sea bass					47, 200	2, 760		
Shad					48, 411	9, 086	10, 450	2, 089
Sheepshead					2, 300	112	3, 590	179
Spadefish							380	16
Spanish mackerel					9, 150	608	1, 815	146
Spot					840, 250	13, 234	662, 000	11, 563
Squeteagues or "sea trout":								
Gray					399, 450	15, 968	419, 937	16, 370
Spotted					251, 000	21, 535	229, 409	17, 303
Striped bass			10, 000	$1, 500	151, 486	11, 493	52, 040	9, 470
Sunfish					6, 275	131	1, 722	35
White perch					178, 962	13, 051	98. 246	6, 115
Yellow perch					23, 600	1, 326	11, 400	718
Crabs:								
Soft					207, 796	33, 363		
Stone					350	11		
Shrimp					94, 250	3, 497		
Turtles, loggerhead					70	2		
Total	133, 735, 450	$536, 766	10, 000	1, 500	6, 658, 154	225, 124	5, 133, 932	134, 778

Species	Gill nets							
	Anchor		Drift		Runaround		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	451, 000	$3, 880	21, 000	$105	4, 000	$23	195, 200	$1, 179
Bluefish	79, 000	3, 360	71, 000	3, 240	56, 350	3, 257	246, 150	11, 244
Bonito	1, 000	33	10, 000	200				
Butterfish	2, 100	69						
Carp	3, 750	295					1, 500	23
Catfish and bullheads	10, 800	532					600	30
Cod	300	15						
Croaker	622, 000	10, 260	71, 000	870	47, 000	810	156, 950	1, 966
Drum, red or redfish	6, 200	171	2, 000	40	900	50	4, 100	50
Eels	300	21						
Flounders	3, 100	165	1, 000	40	6, 000	293	4, 350	169
Gizzard shad	10, 000	143						
Harvestfish	1, 000	30						
Hickory shad	38, 900	2, 505					73, 700	2, 799
King whiting or "kingfish"	130, 500	5, 820	1, 000	40			700	26
Mullet	8, 600	448	355, 000	12, 525	536, 200	22, 138	195, 950	13, 795
Pigfish	4, 700	92			300	3	2, 800	57
Pompano			100	10	100	10	100	13
Sea bass					10, 000	500		
Shad	310, 500	53, 687	52, 200	10, 280	4, 800	770	250, 450	45, 115
Sheepshead			350	15	450	33		
Spanish mackerel	7, 000	560	30, 500	2, 940	50, 000	5, 000	3, 500	222
Spot	199, 500	3, 128	85, 500	1, 560	154, 000	2, 760	110, 050	2, 056
Squeteagues or "sea trout":								
Gray	198, 000	8, 005	22, 000	880	18, 200	659	117, 190	4, 772
Spotted	20, 000	2, 100	11, 000	900	50, 700	4, 671	105, 450	91, 211
Squirrelfish							100	5
Striped bass	84, 200	13, 660	100	20	1, 000	120	33, 350	4, 675
Sturgeon			1, 500	600				
Suckers	5, 500	220						
White perch	27, 200	2, 712					1, 600	136
Yellow perch	3, 400	340						
Total	2, 228, 550	112, 251	735, 250	34, 265	940, 000	41, 097	1, 503, 790	97, 543

Fisheries of North Carolina, 1930—Continued

CATCH: BY GEAR—Continued

Species	Lines							
	Hand		Troll		Trot, with baits or snoods		Trot, with hooks	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	7,750	$745						
Catfish and bullheads	1,000	100					23,100	$693
Cero	2,000	120	7,000	$560				
Crappie	250	50						
Drum, red or redfish	1,000	20						
Eels	500	25						
Flounders	200	8						
Grunts	18,000	360						
Pigfish	500	10						
Pinfish	500	8						
Sea bass	116,000	4,710						
Sheepshead	250	12						
Snapper, red	4,750	195						
Spanish mackerel			15,000	1,200				
Squirrelfish	50	1						
Crabs, hard					1,146,500	$18,745		
Octopus	1,000	150						
Total	153,750	6,514	22,000	1,760	1,146,500	18,745	23,100	693

Species	Pound nets		Weirs		Wheels		Fyke nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	6,799,500	$50,107			135,000	$825	59,400	$733
Black bass							17,500	2,625
Bluefish	11,535	555						
Bowfin	1,300	36					10,700	357
Butterfish	146,475	3,227						
Carp	51,350	2,213	5,000	$250			102,500	7,917
Catfish and bullheads	145,700	7,395					128,200	6,170
Cod	300	12						
Crappie	400	60						
Croaker	1,113,600	13,358						
Drum, red or redfish	18,000	343						
Eels	4,000	332					3,250	300
Flounders	110,400	5,109					13,300	1,187
Garfish	100	6						
Gizzard shad	10,500	143					5,000	91
Harvestfish	156,050	4,241						
Hickory shad	157,150	6,726					500	30
King whiting or "kingfish"	16,000	664						
Mullet	9,050	416					2,100	168
Pigfish	6,700	84						
Pike or pickerel	1,000	150					3,450	370
Pinfish	1,400	22						
Pompano	5,200	525						
Sea bass	50	5						
Shad	493,650	88,622					1,200	240
Sheepshead	4,675	234						
Spadefish	50	1						
Spanish mackerel	14,200	1,100						
Spot	270,490	3,933						
Squeteagues or "sea trout":								
Gray	1,118,350	34,615						
Spotted	24,950	2,371						
Striped bass	106,350	15,569					16,350	3,643
Sturgeon	1,100	240						
Suckers	8,300	401					1,150	33
Sunfish	500	13					300	6
Tripletail	500	19						
White perch	89,000	8,185					47,200	2,793
Yellow perch	8,700	626			6,000	900	42,100	2,486
Turtle, snapper	200	10						
Total	10,906,775	251,668	5,000	250	141,000	1,725	454,200	29,149

Fisheries of North Carolina, 1930—Continued

CATCH: BY GEAR—Continued

Species	Dip nets, common		Otter trawls				Box traps	
			Fish		Shrimp			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	20,000	$100						
Bluefish			2,300	$256	50,000	$3,500		
Cod			200	10				
Croaker			340,000	5,850				
Flounders			80,000	3,800	54,200	2,690		
King whiting or "kingfish"			15,200	608	25,100	802		
Shad	500	100						
Spot			5,000	100				
Squeteagues or "sea trout":								
Gray			9,700	435	30,300	909		
Spotted					1,800	180		
Striped bass	1,000	150					1,000	$250
Suckers							700	70
Yellow perch							1,000	225
Crabs, soft	99,974	15,032						
Shrimp					1,204,360	37,255		
Total	121,474	15,382	452,400	11,059	1,365,760	45,336	2,700	545

Species	Turtle traps		Pots, eel		Spears		Dredges			
							Crab		Oyster	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels			132,500	$9,977						
Flounders					28,000	$1,620				
Crabs, soft							60,000	$7,200		
Oysters:										
Market, public, spring									796,388	$49,652
Market, public, fall									720,599	60,413
Turtles, snapper	300	$15								
Total	300	15	132,500	9,977	28,000	1,620	60,000	7,200	1,516,987	110,065

Species	Dredges—Scallop		Tongs		Rakes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs:								
Hard	13,000	$250						
Soft	10,810	1,473						
Clams, hard, public			35,200	$3,775	243,120	$31,480	38,400	$5,425
Oysters:								
Market, public, spring			364,508	22,673			5,362	400
Market, public, fall			254,366	18,592			64,451	3,418
Scallops, bay	256,656	32,030			175,170	21,893		
Terrapin, diamond-back							90	45
Total	280,466	33,753	654,074	45,040	418,290	53,373	108,303	9,288

OPERATING UNITS: BY COUNTIES

Item	Beaufort	Bertie	Brunswick	Camden	Carteret	Chowan	Craven	Currituck
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	56		179		788	3	3	
On boats and shore—								
Regular	151	25	81	8	1,102		11	278
Casual	93	15	51		248	169	70	1
Total	300	40	311	8	2,138	172	84	279

Fisheries of North Carolina, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Beaufort	Bertie	Brunswick	Camden	Carteret	Chowan	Craven	Currituck
Vessels:								
Motor—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
5 to 10 tons	-------	-------	4	-------	52	-------	1	-------
11 to 20 tons	-------	-------	-------	-------	7	-------	-------	-------
21 to 30 tons	-------	-------	-------	-------	3	1	-------	-------
31 to 40 tons	-------	-------	4	-------	6	-------	-------	-------
41 to 50 tons	-------	-------	2	-------	4	-------	-------	-------
51 to 60 tons	-------	-------	1	-------	5	-------	-------	-------
61 to 70 tons	-------	-------	1	-------	2	-------	-------	-------
71 to 80 tons	-------	-------	-------	-------	2	-------	-------	-------
81 to 90 tons	-------	-------	1	-------	-------	-------	-------	-------
Total	-------	-------	13	-------	81	1	1	-------
Net tonnage	-------	-------	477	-------	1, 502	21	5	-------
Sail—								
5 to 10 tons	18	-------	-------	-------	13	-------	-------	-------
11 to 20 tons	2	-------	-------	-------	6	-------	-------	-------
21 to 30 tons	2	-------	-------	-------	-------	-------	-------	-------
Total	22	-------	-------	-------	19	-------	-------	-------
Net tonnage	213	-------	-------	-------	185	-------	-------	-------
Total vessels	22	-------	13	-------	100	1	1	-------
Total net tonnage	213	-------	477	-------	1, 687	21	5	-------
Boats:								
Motor	93	16	26	5	460	45	45	116
Other	91	16	45	5	495	45	31	119
Accessory boats	-------	-------	18	-------	97	-------	2	-------
Apparatus:								
Purse seines—								
Menhaden	-------	-------	9	-------	43	-------	-------	-------
Length, yards	-------	-------	2, 335	-------	11, 000	-------	-------	-------
Haul seines—								
Common	13	-------	9	-------	305	-------	4	101
Length, yards	3, 950	-------	1, 500	-------	21, 946	-------	900	18, 850
Long	-------	1	-------	-------	42	-------	1	12
Length, yards	-------	1, 600	-------	-------	48, 900	-------	900	10, 200
Gill nets—								
Anchor	-------	-------	-------	90	102	200	14	183
Square yards	-------	-------	-------	21, 300	92, 276	150, 000	4, 800	58, 025
Drift	-------	-------	-------	-------	86	-------	-------	-------
Square yards	-------	-------	-------	-------	75, 283	-------	-------	-------
Runaround	7	-------	42	-------	108	-------	4	-------
Square yards	2, 820	-------	16, 212	-------	83, 214	-------	2, 000	-------
Stake	712	3	-------	-------	1, 696	-------	378	110
Square yards	47, 100	400	-------	-------	110, 160	-------	14, 970	9, 900
Lines—								
Hand	-------	-------	-------	-------	28	-------	-------	-------
Hooks	-------	-------	-------	-------	56	-------	-------	-------
Troll	-------	-------	-------	-------	15	-------	-------	-------
Hooks	-------	-------	-------	-------	15	-------	-------	-------
Trot, with baits or snoods	86	-------	-------	-------	-------	-------	-------	-------
Baits or snoods	63, 600	-------	-------	-------	-------	-------	-------	-------
Trot, with hooks	-------	-------	2	-------	-------	-------	-------	-------
Hooks	-------	-------	240	-------	-------	-------	-------	-------
Pound nets	192	80	-------	-------	142	507	43	-------
Wheels	-------	5	-------	-------	-------	-------	30	-------
Fyke nets	-------	-------	-------	75	-------	4	-------	475
Dip nets, common	-------	-------	-------	-------	231	-------	-------	-------
Otter trawls—								
Fish	-------	-------	-------	-------	-------	1	-------	-------
Yards at mouth	-------	-------	-------	-------	-------	20	-------	-------
Shrimp	-------	-------	30	-------	21	-------	-------	-------
Yards at mouth	-------	-------	495	-------	396	-------	-------	-------
Pots, eel	45	-------	-------	-------	50	150	40	860
Spears	-------	-------	-------	-------	19	-------	-------	-------
Dredges—								
Crab	-------	-------	-------	-------	80	-------	-------	-------
Yards at mouth	-------	-------	-------	-------	107	-------	-------	-------
Oyster	64	-------	-------	-------	36	-------	-------	-------
Yards at mouth	54	-------	-------	-------	44	-------	-------	-------
Scallop	-------	-------	-------	-------	328	-------	-------	-------
Yards at mouth	-------	-------	-------	-------	318	-------	-------	-------
Tongs	-------	-------	10	-------	208	-------	-------	-------
Rakes	-------	-------	15	-------	347	-------	-------	-------

Fisheries of North Carolina, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Dare	Gates	Hertford	Hyde	Lenoir	Martin	New Hanover	Onslow
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	3			3				3
On boats and shore—								
Regular	589		6	81		18	140	4
Casual		20		25	35	22	50	115
Total	592	20	6	109	35	40	190	122
Vessels:								
Motor—5 to 10 tons	1							1
Net tonnage	7							8
Sail—5 to 10 tons				1				
Net tonnage				6				
Boats:								
Motor	229	2	2	46	4	8	45	45
Other	189	20	3	32	16	26	90	50
Apparatus:								
Purse seines—Other	4							
Length, yards	700							
Haul seines—								
Common	67				4	3	22	22
Length, yards	19, 800				300	950	3, 520	2, 042
Long	27			2				
Length, yards	19, 850			1, 400				
Gill nets—								
Anchor	560							14
Square yards	222, 950							15, 000
Drift		20		10		12	42	
Square yards		2, 000		11, 660		850	82, 410	
Runaround	14			11			70	140
Square yards	8, 400			12, 833			10, 300	53, 200
Stake	6, 473			695	15	2		
Square yards	474, 570			44, 700	600	78		
Lines—								
Hand					20			50
Hooks					40			300
Trot, with baits or snoods	7			2				
Baits or snoods	5, 600			1, 600				
Trot, with hooks						7	5	
Hooks						350	250	
Pound nets	807	10	17	95				
Weirs						4		
Wheels						15		
Fyke nets	8	25				2		
Dip nets, common						12		
Box traps					10			
Turtle traps				30				
Pots, eel	100			5		16		
Spears								20
Dredges—								
Oyster	14			41				
Yards at mouth	14			32				
Tongs	26			30				55
Rakes	6						50	25

Item	Pamlico	Pasquotank	Pender	Perquimans	Pitt	Tyrrell	Washington
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	102	19					
On boats and shore—							
Regular	32	39	7	43	2	48	28
Casual	149		190		10	40	50
Total	283	58	197	43	12	88	78
Vessels:							
Motor—							
5 to 10 tons	6	2					
11 to 20 tons		4					
Total	6	6					
Net tonnage	41	79					

Fisheries of North Carolina, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Pamlico	Palquotank	Pender	Perquimans	Pitt	Tyrrell	Washington
Vessels—Continued.							
Sail—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
5 to 10 tons	18						
11 to 20 tons	5	1					
21 to 30 tons	1						
Total	24	1					
Net tonnage	216	11					
Total vessels	30	7					
Total net tonnage	257	90					
Boats:							
Motor	89	19	4	23	1	36	16
Other	66	20	145	23	2	36	21
Accessory boats	6						
Apparatus:							
Haul seines—							
Common	8		19		1		2
Length, yards	1,900		2,850		600		1,600
Long	2						
Length, yards	1,800						
Gill nets—							
Anchor		556		425		265	120
Square yards		214,120		317,050		131,411	60,920
Runaround			30				
Square yards			10,000				
Stake	445	60				640	
Square yards	12,950	2,400				23,472	
Lines—							
Trot with baits or snoods	82						
Baits or snoods	52,000						
Pound nets	179	22		62		120	67
Fyke nets		124				134	
Dip nets, common							1
Otter trawls—							
Fish		3					
Yards at mouth		54					
Shrimp			1				
Yards at mouth			17				
Pots, eel	40	36		100		60	
Spears			15				
Dredges—							
Oyster	80	8					
Yards at mouth	88	9					
Tongs	91		60				
Rakes			200				

CATCH: BY COUNTIES

Species	Beaufort		Bertie		Brunswick		Camden	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	391,000	$1,964	1,188,000	$5,940			16,000	$175
Black bass							2,500	375
Bluefish					50,000	$3,500		
Bowfin							1,200	24
Butterfish	15,000	300						
Carp	19,200	565					8,000	640
Catfish and bullheads	14,200	630	1,000	50	2,100	63	3,000	120
Croaker	187,000	1,910			32,000	320		
Drum, red or redfish					1,800	108		
Eels	10,000	1,000					600	45
Flounders	17,800	819			54,200	2,690	100	5
Gizzard shad							500	8
Hickory shad	16,700	481					500	25
King whiting or "kingfish"					26,100	862		
Menhaden					24,325,200	121,344		
Mullet	32,700	1,358			237,510	9,188	1,500	120
Pigfish	500	15						
Pike or pickerel							250	25
Pompano	100	10						
Sea bass					17,200	860		

Fisheries of North Carolina, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Beaufort		Bertie		Brunswick		Camden	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Shad	65,550	$15,182	11,400	$1,760	3,800	$570	1,500	$300
Sheepshead	150	12			300	21		
Spot	12,000	230			14,000	280		
Squeteagues or "sea trout":								
Gray	69,000	2,070			31,000	930		
Spotted	4,500	450			11,800	1,180		
Striped bass	7,300	755	3,500	425			3,000	600
White perch	4,400	440	22,000	1,630			6,800	430
Yellow perch	3,100	205					2,500	125
Crabs, hard	761,200	8,782						
Shrimp					453,500	13,305		
Clams, hard, public					20,800	3,100		
Oysters:								
Market, public, spring	86,711	8,230						
Market, public, fall	153,970	17,250			5,898	550		
Total	1,872,081	62,658	1,225,900	9,805	25,287,208	158,871	47,950	3,017

Species	Carteret		Chowan		Craven		Currituck	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	37,000	$420	3,172,800	$28,529	127,500	$836	16,900	$418
Black bass							89,213	12,965
Bluefish	446,800	20,355	500	40	16,350	327	4,500	225
Bonito	11,000	233					1,000	30
Bowfin							13,980	463
Butterfish	32,785	1,076			49,000	980	1,000	50
Carp			4,500	210			352,689	26,518
Catfish and bullheads			60,000	3,000			165,572	6,979
Cero	9,000	680						
Cod			200	10			300	15
Croaker	2,435,750	41,374	75,000	1,400	217,810	2,178	65,000	1,300
Drum, red or redfish	66,050	1,108			1,000	10	1,000	40
Eels	1,000	100	3,400	292	20,000	1,400	52,110	3,769
Flounders	31,750	1,508	20,100	806	14,300	419	13,250	947
Gizzard shad			4,000	40			11,991	210
Grunts	18,000	360						
Harvestfish	231,000	7,560					1,000	30
Hickory shad	48,200	1,570	16,400	1,200	3,500	105	3,000	175
King whiting or "kingfish"	142,200	5,624	1,200	48			7,500	375
Menhaden	109,726,040	414,287						
Mullet	926,440	25,748			121,100	8,432	2,800	196
Pigfish	84,700	1,437					850	11
Pike or pickerel							7,820	868
Pinfish	31,500	473						
Pompano	2,650	261					200	30
Sea bass	110,050	4,405						
Shad	41,000	7,690	72,350	13,175	53,150	10,655	22,800	3,839
Sheepshead	4,890	232					400	23
Snapper, red	2,750	155						
Spadefish	380	16						
Spanish mackerel	108,165	10,124					850	85
Spot	1,392,350	22,943	5,000	100	76,000	1,270	16,000	330
Squeteagues or "sea trout":								
Gray	695,690	28,292	5,000	200	91,537	2,146	18,000	960
Spotted	206,550	14,942			29,809	3,577	18,000	1,640
Squirrelfish	50	1						
Striped bass	17,290	1,644	19,800	3,910	16,350	2,438	61,822	11,999
Suckers			8,000	380			500	10
Sunfish							7,597	158
White perch	400	20	10,500	900			202,448	11,590
Yellow perch			3,500	280	6,000	900	57,350	3,132
Crabs:								
Hard	13,000	250						
Soft	378,580	57,068						
Shrimp	799,860	25,650						
Clams, hard, public	184,000	23,125						

Fisheries of North Carolina, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Carteret		Chowan		Craven		Currituck	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Oysters:								
Market, public, spring	589, 820	29, 820						
Market, public, fall	379, 683	26, 014						
Scallops, bay	431, 826	53, 923						
Octopus	1, 000	150						
Terrapin, diamond-back	90	45						
Turtles, loggerhead							70	$2
Total	119, 639, 289	830, 683	$3,482,250	$54, 520	843, 406	$35, 673	1, 217, 512	89, 382

Species	Dare		Gates		Hertford		Hyde	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	206, 400	$3, 278	40, 000	$600	103, 000	$575	58, 000	$950
Black bass	13, 500	2, 025						
Bluefish	194, 685	11, 979					127, 400	5, 096
Bonito	6, 850	207						
Bowfin	1, 300	26	500	10				
Butterfish	23, 775	660					54, 500	1, 105
Carp	47, 150	2, 016	300	15			1, 000	20
Catfish and bullheads	47, 000	1, 810	6, 200	260				
Cod	700	20						
Crappie			400	60				
Croaker	460, 550	7, 802					599, 000	5, 830
Drum, red or redfish	22, 100	494					42, 000	610
Eels	9, 100	690	200	16			1, 000	100
Flounders	79, 800	3, 984					2, 500	125
Garfish	100	6						
Gizzard shad	2, 500	45						
Harvestfish	38, 700	1, 049					72, 600	1, 472
Hickory shad	132, 500	6, 105	1, 000	60			17, 750	425
King whiting or "kingfish"	43, 950	1, 476					6, 400	320
Mullet	79, 200	3, 246					196, 500	6, 000
Pigfish	3, 650	68						
Pike or pickerel	1, 200	174						
Pinfish	400	7						
Pompano	5, 650	606						
Shad	578, 400	95, 498	4, 950	800	500	75	10, 700	1, 840
Sheepshead	1, 350	72					3, 225	161
Spadefish	50	1						
Spanish mackerel	8, 050	791					8, 100	476
Spot	219, 240	3, 807					161, 200	3, 224
Squeteagues or "sea trout":								
Gray	746, 450	27, 085					355, 250	11, 735
Spotted	346, 050	29, 157					43, 100	3, 550
Squirrelfish	100	5						
Striped bass	136, 200	19, 705	400	74			2, 200	80
Sturgeon	700	140					400	100
Suckers			200	8				
Sunfish	1, 200	27						
Tripletail	500	19						
White perch	26, 750	1, 365	2, 500	260	1, 000	100		
Yellow perch	6, 350	3, 222	200	16				
Crabs, hard	50, 000	800					13, 300	133
Clams, hard, public	1, 600	400					800	100
Oysters:								
Market, public, spring	179, 856	9, 625					70, 526	6, 672
Market, public, fall	33, 244	2, 800					65, 550	6, 208
Turtles, snapper							300	15
Total	3, 756, 850	239, 392	56, 850	2, 179	104, 500	750	1, 913, 301	56, 347

Fisheries of North Carolina, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Lenoir		Martin		New Hanover		Onslow	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives			214,000	$1,220				
Carp	1,000	$50	16,000	800				
Catfish and bullheads	1,000	100	13,500	405	10,000	$300		
Crappie	250	50						
Croaker					2,100	42	12,000	$130
Drum, red or redfish					600	24		
Eels	500	25	15,000	750				
Flounders					4,500	225	7,000	490
Hickory shad	3,000	150						
King whiting or "kingfish"					1,000	100	30,000	1,800
Mullet					330,000	16,500	169,000	6,305
Porgies					1,000	30		
Sea bass					40,000	2,400	6,000	310
Shad	2,000	400	1,500	300	48,000	9,600		
Snapper, red							2,000	40
Spanish mackerel					6,000	300		
Spot					143,000	2,860	15,000	175
Squeteagues or "sea trout":								
Gray							2,500	85
Spotted					1,000	100	8,500	1,025
Striped bass	4,000	1,000	6,000	825				
Sturgeon					1,500	600		
Suckers	700	70						
White perch			2,000	200				
Yellow perch	1,000	225						
Crabs, stone							350	11
Shrimp					43,250	1,297		
Clams, hard, public					56,000	8,750	12,000	1,125
Oysters:								
Market, public, spring							16,086	1,000
Market, public, fall							16,086	1,000
Total	13,450	2,070	268,000	4,500	687,950	43,128	296,522	13,496

Species	Pamlico		Pasquotank		Pender		Perquimans	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	75,000	$668	101,500	$1,580			180,000	$1,600
Black bass			1,200	180				
Bluefish	900	43	1,800	216				
Bowfin			1,250	15			1,000	30
Butterfish	6,500	130						
Carp	700	13	3,150	237			5,500	275
Catfish and bullheads			64,800	2,695			33,000	1,960
Croaker	752,000	8,530	265,100	4,453	5,000	$150		
Drum, red or redfish	10,500	80						
Eels	5,000	400	4,750	330			15,100	1,510
Flounders	27,200	1,193	62,700	3,157	5,000	250	2,100	90
Gizzard shad			15,000	258			5,000	53
Hickory shad	14,500	485	10,000	530			17,500	1,360
King whiting or "kingfish"			14,000	560				
Mullet	100,400	8,030	2,700	216	185,000	5,975	1,500	120
Pigfish	4,500	65						
Pike or pickerel			700	70				
Shad	73,000	14,800	61,300	10,257			85,000	16,885
Sheepshead	1,300	64						
Spot	148,000	1,680			125,000	1,435		
Squeteagues or "sea trout":								
Gray	314,000	8,875	4,700	235				
Spotted	25,000	2,650						
Striped bass	1,100	43	25,000	4,800			60,000	9,000
Suckers			450	15			5,800	241
White perch			18,700	1,586			52,000	5,200
Yellow perch			4,300	226			500	50
Crabs, hard	322,000	9,030						
Shrimp					2,000	500		
Clams, hard, public					41,520	4,080		
Oysters:								
Market, public, spring	208,245	15,278	15,014	2,100				
Market, public, fall	376,942	27,521	8,043	1,080				
Total	2,466,787	99,578	686,157	34,796	363,520	12,390	464,000	38,374

Fisheries of North Carolina, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Pitt		Tyrrell		Washington	
	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	70,000	$350	1,798,400	$8,992	2,043,227	$10,213
Carp	1,000	50	10,000	1,000		
Catfish and bullheads			28,700	1,435	10,000	500
Eels			4,500	360		
Flounders			7,500	750		
Hickory shad	1,200	36			38,210	1,150
Shad	2,250	461	13,400	2,680	19,611	3,222
Striped bass			12,100	1,855	80,814	1,397
White perch	1,000	100	12,800	1,280	78,910	7,891
Yellow perch			11,400	1,140		
Turtles, snapper					200	10
Total	75,450	997	1,898,800	19,492	2,270,972	24,383

Industries related to the fisheries of North Carolina, 1930

TRANSPORTING

Item	Beaufort County	Bertie County	Carteret County	Craven County	Dare County	Hyde County	Pasquotank County	Washington County	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Persons engaged:									
On vessels	13		20	3	8	2	6	2	54
On boats		1		4					5
Total	13	1	20	7	8	2	6	2	59
Vessels, motor:									
5 to 10 tons	4		14	2	1			1	22
11 to 20 tons	2		2	1	3	1	1		10
21 to 30 tons							1		1
Total	6		16	3	4	1	2	1	33
Net tonnage	61		117	25	43	16	47	6	315
Boats		1		2					3

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Beaufort County	Brunswick County	Carteret County	Craven and Pamlico Counties	New Hanover Counties	Washington, Pasquotank, and Bertie Counties	Total
Establishments	10	3	36	11	5	6	71
Persons engaged:							
Proprietors	11	4	47	13	5	10	90
Salaried employees	1	3	18	1		3	26
Wage earners—							
Average for season	159	134	323	213	3	220	1,052
Average for year	66	22	127	59		31	305
Paid to salaried employees	$4,080	$5,595	$25,010	$500		$13,577	$48,762
Paid to wage earners	28,335	15,952	93,443	28,014	$1,150	18,268	185,162
Total salaries and wages	32,415	21,547	118,453	28,514	1,150	31,845	233,924

Industries related to the fisheries of North Carolina, 1930—Continued

WHOLESALE AND MANUFACTURING—Continued

PRODUCTS MANUFACTURED

Item	Quantity	Value
Alewives, salted ... pounds	795,000	$24,500
Menhaden products:		
Acid scrap ... tons	3,379	83,414
Dry scrap ... do	2,894	133,149
Meal ... do	1,457	76,909
Oil ... gallons	308,472	51,877
Mullet, salted ... pounds	666,660	42,109
Spot, salted ... do	172,000	10,220
Oysters:		
Fresh-shucked ... gallons	112,539	140,465
Canned ... standard cases	9,945	49,529
Miscellaneous [1]	(2)	224,579
Total		836,751

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 417]

Item	Quantity	Value
Alewives:		
Salted ... pounds	2,245,800	$38,971
Corned ... do	1,505,800	27,280
Mullet, salted ... do	143,200	10,828
Sturgeon roe, fresh ... do	140	140
Scallops, bay, fresh-shucked ... gallons	47,000	53,000
Total		130,219

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[1] Includes fresh-cooked crab meat; cooked and canned shrimp; pickled alewives; fresh fillets of butterfish, croaker, and squeteague; canned alewife roe; and oyster-shell products.

[2] Data not available.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons employed on transporting craft, 1 has also been included as a fisherman, and among the total persons engaged in the preparation of fishermen's manufactured products, 344 have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries, exclusive of duplication.

SOUTH CAROLINA

Fisheries of South Carolina, 1930

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets			Lines		Dip nets, common
		Anchor	Drift	Run-around	Hand	Trot, with baits or snoods	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:							
On vessels					21		
On boats and shore—							
Regular	18	40	50	27	91	6	10
Casual	288	191	230		15		
Total	306	231	280	27	127	6	10
Vessels, motor:							
5 to 10 tons					2		
11 to 20 tons					1		
Total vessels					3		
Total net tonnage					29		
Boats:							
Motor	3	1	10		9		
Other	79	201	172	27	40		10
Apparatus:							
Number	21	282	157	27	127	6	10
Length, yards	3,535						
Square yards		82,000	160,790	13,000			
Hooks, baits, or snoods					460	4,800	

Fisheries of South Carolina, 1930—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Otter trawls, shrimp	Spears	Dredges, oyster	Tongs	Rakes	Grabs	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	19		6					39
On boats and shore—								
Regular	52	30		27	15	451	40	705
Casual	6			50	32	50	9	756
Total	77	30	6	77	47	501	49	1,500
Vessels, motor:								
5 to 10 tons	3							5
11 to 20 tons	4		1					5
Total vessels	7		1					10
Total net tonnage	88		19					124
Boats:								
Motor	29							51
Other		30		45	31	477	7	969
Apparatus:								
Number	36	30	2	77	47	501		
Yards at mouth	675		3					

CATCH: BY GEAR

Species	Haul seines		Gill nets					
			Anchor		Drift		Runaround	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					2,000	$10		
Croaker	1,000	$10						
Drum, red or redfish	7,350	377						
Flounders	2,000	100					725	$36
Hickory shad			3,250	$145	4,250	185		
King whiting or "kingfish"	3,080	201						
Mullet	358,000	18,272					54,000	2,700
Shad			89,857	15,428	122,310	16,589		
Spot	11,200	324					17,000	340
Squeteagues or "sea trout":								
Gray	2,000	100						
Spotted	7,400	740					2,300	230
Sturgeon			8,464	1,693	6,500	1,300		
Terrapin, diamond-back	1,619	598						
Total	393,649	20,722	101,571	17,266	135,060	18,084	74,025	3,306

Fisheries of South Carolina, 1930—Continued

CATCH: BY GEAR—Continued

Species	Lines				Dip nets, common		Otter trawls, shrimp		Spears	
	Hand		Trot, with baits or snoods							
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	100	$10								
Catfish and bullheads	2,000	40								
Croaker	1,000	50								
Drum:										
Black	500	25								
Red or redfish	1,000	89								
Flounders	300	30					2,000	$100	25,000	$2,000
Grunts	8,000	640								
King whiting or "kingfish"	30,000	3,000					5,000	250		
Pigfish	725	22								
Pinfish	2,000	80								
Pompano	100	15								
Porgies	100	8								
Sea bass	197,250	15,587								
Shad					2,325	$348				
Sharks	10,000	200								
Sheepshead	100	10								
Skates	1,000	50								
Snapper, mangrove	3,000	240								
Spot	100	5								
Squeteagues or "sea trout":										
Gray	20,000	1,600					2,000	20		
Spotted	1,200	120								
Squirrelfish	350	18								
Crabs, hard			26,000	$780						
Shrimp							792,733	31,814		
Octopus	3,500	290								
Total	282,325	22,129	26,000	780	2,325	348	801,733	32,184	25,000	2,000

Species	Dredges, oyster		Tongs		Rakes		Grabs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams, hard, public					11,200	$1,400				
Oysters:										
Market, public, spring							1,738,968	$58,387	3,089	$500
Market, public, fall			9,221	$750	6,915	450	661,370	23,714	6,454	1,000
Market, private, spring	115,255	$10,000	43,566	2,363			387,257	21,000		
Market, private, fall			22,853	1,238			253,561	13,750		
Terrapin, diamond-back									4,200	1,488
Total	115,255	10,000	75,640	4,351	18,115	1,850	3,041,156	116,851	13,743	2,988

OPERATING UNITS: BY COUNTIES

Item	Beaufort	Charleston	Colleton	Georgetown	Horry
	Number	*Number*	*Number*	*Number*	*Number*
Fishermen:					
On vessels		39			
On boats and shore—					
Regular	326	256		100	23
Casual	74	143	129	230	180
Total	400	438	129	330	203
Vessels, motor:					
5 to 10 tons		5			
11 to 20 tons		5			
Total vessels		10			
Total net tonnage		124			

Fisheries of South Carolina, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Beaufort	Charleston	Colleton	Georgetown	Horry
Boats:	*Number*	*Number*	*Number*	*Number*	*Number*
Motor	----------	35	1	12	3
Other	372	230	109	188	70
Apparatus:					
Haul seines	2	2	----------	4	13
Length, yards	135	100	----------	800	2, 500
Gill nets—					
Anchor	60	40	142	40	----------
Square yards	12, 000	16, 000	35, 400	18, 600	----------
Drift	20	17	20	100	----------
Square yards	10, 000	24, 100	24, 000	102, 690	----------
Runaround	----------	----------	----------	27	----------
Square yards	----------	----------	----------	13, 000	----------
Lines—					
Hand	----------	92	----------	20	15
Hooks	----------	360	----------	40	60
Trot, with baits or snoods	----------	6	----------	----------	----------
Baits or snoods	----------	4, 800	----------	----------	----------
Dip nets, common	----------	----------	----------	----------	10
Otter trawls, shrimp	----------	35	----------	1	----------
Yards at mouth	----------	655	----------	20	----------
Spears	----------	----------	----------	30	----------
Dredges, oyster	----------	2	----------	----------	----------
Yards at mouth	----------	3	----------	----------	----------
Tongs	10	17	----------	----------	50
Rakes	----------	----------	----------	15	32
Grabs	316	185	----------	----------	----------

CATCH: BY COUNTIES

Species	Beaufort		Charleston		Colleton		Georgetown		Horry	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	----------	------	----------	------	----------	------	2, 000	$10	----------	------
Bluefish	----------	------	100	$10	----------	------	----------	------	----------	------
Catfish and bullheads	----------	------	2, 000	40	----------	------	----------	------	----------	------
Croaker	----------	------	1, 000	50	----------	------	1, 000	10	----------	------
Drum:										
Black	----------	------	500	25	----------	------	----------	------	----------	------
Red or redfish	----------	------	1, 000	89	----------	------	3, 250	162	4, 100	$215
Flounders	----------	------	2, 300	130	----------	------	26, 025	2, 051	1, 700	85
Grunts	----------	------	8, 000	640	----------	------	----------	------	----------	------
Hickory shad	500	$50	----------	------	----------	------	7, 000	280	----------	------
King whiting or "kingfish"	----------	------	35, 000	3, 250	----------	------	450	27	2, 630	174
Mullet	----------	------	----------	------	----------	------	104, 000	5, 200	308, 000	15, 772
Pigfish	----------	------	----------	------	----------	------	----------	------	725	22
Pinfish	----------	------	----------	------	----------	------	1, 000	50	1, 000	30
Pompano	----------	------	100	15	----------	------	----------	------	----------	------
Porgies	----------	------	100	8	----------	------	----------	------	----------	------
Sea bass	----------	------	182, 000	14, 560	----------	------	4, 000	240	11, 250	787
Shad	13, 927	2, 785	20, 750	3, 882	54, 700	$9, 965	122, 790	15, 385	2, 325	348
Sharks	----------	------	10, 000	200	----------	------	----------	------	----------	------
Sheepshead	----------	------	100	10	----------	------	----------	------	----------	------
Skates	----------	------	1, 000	50	----------	------	----------	------	----------	------
Snapper, mangrove	----------	------	3, 000	240	----------	------	----------	------	----------	------
Spot	----------	------	100	5	----------	------	18, 200	364	10, 000	300
Squeteagues or "sea trout":										
Gray	----------	------	22, 000	1, 620	----------	------	----------	------	2, 000	100
Spotted	----------	------	----------	------	----------	------	4, 800	480	6, 100	610
Squirrelfish	----------	------	350	18	----------	------	----------	------	----------	------
Sturgeon	----------	------	----------	------	8, 464	1, 693	6, 500	1, 300	----------	------
Crabs, hard	----------	------	26, 000	780	----------	------	----------	------	----------	------
Shrimp	----------	------	780, 233	31, 189	----------	------	12, 500	625	----------	------
Clams, hard, public	----------	------	----------	------	----------	------	4, 800	600	6, 400	800
Oysters:										
Market, public, spring	1, 157, 797	38, 835	584, 260	20, 052	----------	------	----------	------	----------	------
Market, public, fall	564, 095	20, 514	103, 730	4, 200	----------	------	6, 915	450	9, 220	750
Market, private, spring	15, 905	863	530, 173	32, 500	----------	------	----------	------	----------	------
Market, private, fall	22, 853	1, 238	253, 561	13, 750	----------	------	----------	------	----------	------
Octopus	----------	------	3, 500	290	----------	------	----------	------	----------	------
Terrapin, diamond-back	4, 019	1, 411	1, 800	675	----------	------	----------	------	----------	------
Total	1, 779, 096	65, 696	2, 572, 657	128, 278	63, 164	11, 658	325, 230	27, 234	365, 450	19, 993

Industries related to the fisheries of South Carolina, 1930

TRANSPORTING

Item	Beaufort County	Charleston County	Total
	Number	*Number*	*Number*
Persons engaged:			
On vessels	78	28	106
On boats	7		7
Total	85	28	113
Vessels:			
Motor—			
5 to 10 tons		7	7
11 to 20 tons	1	5	6
Total	1	12	13
Net tonnage	13	125	138
Sail—			
5 to 10 tons	26	3	29
11 to 20 tons	9	1	10
21 to 30 tons	1		1
Total	36	4	40
Net tonnage	330	38	368
Total vessels	37	16	53
Total net tonnage	343	163	506
Boats	28	5	33

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Beaufort County	Charleston County	Georgetown County	Total
Establishments	17	12	3	32
Persons engaged:				
Proprietors	18	12	3	33
Salaried employees	8	13	3	24
Wage earners—				
Average for season	833	460	34	1,327
Average for year	286	191	14	491
Paid to salaried employees	$26,271	$42,248	$1,405	$69,924
Paid to wage earners	95,908	80,276	13,290	189,474
Total salaries and wages	122,179	122,524	14,695	259,398

PRODUCTS MANUFACTURED

Item		Quantity	Value
Shrimp, canned	standard cases	40,108	$245,688
Oysters:			
Fresh-shucked	gallons	32,943	38,750
Canned	standard cases	93,288	408,465
Miscellaneous [1]		(2)	189,635
Total			882,538

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 37]

Item		Quantity	Value
Mullet, salted	pounds	360,000	$28,800
Sturgeon roe, salted	do	182	137
Total		360,182	28,937

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[1] Includes menhaden and oyster-shell products.

(2) Data not available.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons employed on transporting craft, 74 have also been included as fishermen, and among the total persons engaged in the preparation of fishermen's manufactured products, 37 have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

GEORGIA

Fisheries of Georgia, 1930

OPERATING UNITS: BY GEAR

Item	Purse seines, menhaden	Haul seines	Gill nets				Lines	
			Anchor	Drift	Run-around	Stake	Hand	Trot, with baits or snoods
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	90						8	
On boats and shore—								
Regular		28		12	34	2		6
Casual		32	22	265	11	53		
Total	90	60	22	277	45	55	8	6
Vessels:								
Steam—								
41 to 50 tons	1							
51 to 60 tons	1							
61 to 70 tons	1							
Total	3							
Net tonnage	166							
Motor—								
11 to 20 tons							1	
Net tonnage							14	
Total vessels	3						1	
Total net tonnage	166						14	
Boats:								
Motor				6	13	1		
Other		24	19	140	32	42		6
Accessory boats	9						3	
Apparatus:								
Number	3	16	27	146	45	105	8	6
Length, yards	900	1,850						
Square yards			6,090	275,045	14,310	54,540		
Hooks, baits, or snoods							16	1,950

Item	Lines, trot, with hooks	Fyke nets	Cast nets	Otter trawls, shrimp	Traps, crab	Tongs	Rakes	Grabs	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				46					144
On boats and shore—									
Regular			22	288	30	62		34	371
Casual	68	30	18	15		46	6	50	472
Total	68	30	40	349	30	108	6	84	987
Vessels:									
Steam—									
41 to 50 tons									1
51 to 60 tons									1
61 to 70 tons									1
Total									3
Net tonnage									166
Motor—									
5 to 10 tons				21					21
11 to 20 tons				2					3
Total				23					24
Net tonnage				181					195
Total vessels				23					27
Total net tonnage				181					361
Boats:									
Motor				175					178
Other	18	10	40		30	108	6	64	421
Accessory boats									12
Apparatus:									
Number	68	60	40	182	30	108	6	84	
Yards at mouth				3,774					
Hooks, baits, or snoods	3,400								

Fisheries of Georgia, 1930—Continued

CATCH: BY GEAR

Species	Purse seines, menhaden		Haul seines		Gill nets			
					Anchor		Drift	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Croaker			1,000	$20				
Flounders			300	24				
Hickory shad					2,600	$208	15,700	$1,226
Menhaden	24,701,250	$94,100						
Mullet			30,000	1,500			5,000	250
Shad					15,800	3,160	223,705	44,541
Spot			1,200	24				
Squeteagues or "sea trout", spotted			1,300	130				
Sturgeon							4,500	900
Terrapin, diamond-back			19,700	5,040				
Total	24,701,250	94,100	53,500	6,738	18,400	3,368	248,905	46,917

Species	Gill nets—Continued				Lines			
	Runaround		Stake		Hand		Trot, with baits or snoods	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish					1,012	$227		
Croaker	14,500	$290						
Drum:								
Black	1,000	30						
Red or redfish	5,250	210						
Flounders	5,300	365						
Groupers					7,354	441		
Grunts					390	32		
Hickory shad			7,200	$576				
Jewfish					4,629	232		
King whiting or "kingfish"	16,250	363						
Mullet	72,800	4,245						
Sea bass	2,000	80			20,840	2,005		
Shad			35,250	7,050				
Sheepshead	700	42						
Snapper:								
Mangrove					200	16		
Red					29,854	2,462		
Spot	3,750	55						
Squeteagues or "sea trout":								
Gray	3,000	130						
Spotted	47,150	3,762						
Striped bass			500	100				
Crabs, hard							154,000	$3,080
Total	171,700	9,572	42,950	7,726	64,279	5,415	154,000	3,080

Species	Lines—Trot, with hooks		Fyke nets		Cast nets		Otter trawls, shrimp	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	16,000	$740	212,000	$6,360				
Flounders							3,200	$224
King whiting or "kingfish"							22,000	1,100
Mullet					69,000	$3,800		
Spot							7,000	140
Crabs, hard							7,000	140
Shrimp							8,852,712	334,576
Total	16,000	740	212,000	6,360	69,000	3,800	8,891,912	336,180

Fisheries of Georgia, 1930—Continued

CATCH: BY GEAR—Continued

Species	Pots, crab		Tongs		Rakes		Crabs	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, hard	67, 000	$1, 340						
Clams, hard, public					2, 240	$350		
Oysters:								
Market, public, spring			29, 978	$2, 740				
Market, public, fall			21, 161	1, 440				
Market, private, spring			18, 957	2, 060			31, 752	$1, 363
Market, private, fall			18, 975	1, 356			38, 562	1, 649
Total	67, 000	1, 340	89, 071	7, 596	2, 240	350	70, 314	3, 012

OPERATING UNITS: BY COUNTIES

Item	Bryan	Bullock	Camden	Charleston	Chatham	Glynn
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			94		24	24
On boats and shore—						
Regular			50		68	180
Casual	55	16	44	18	212	56
Total	55	16	188	18	304	260
Vessels:						
Steam—						
41 to 50 tons			1			
51 to 60 tons			1			
61 to 70 tons			1			
Total			3			
Net tonnage			166			
Motor—						
5 to 10 tons			2		7	11
11 to 20 tons					2	1
Total			2		9	12
Net tonnage			18		79	88
Total vessels			5		9	12
Total net tonnage			184		79	88
Boats:						
Motor			27		62	68
Other	29	8	20	9	165	102
Accessory boats			9		3	
Apparatus:						
Purse seines, menhaden			3			
Length, yards			900			
Haul seines					4	12
Length, yards					300	1, 550
Gill nets—						
Anchor	5					13
Square yards	1, 900					1, 610
Drift	26	8	22	9	31	25
Square yards	83, 200	3, 056		2, 700	162, 505	8, 100
Runaround					20	22
Square yards					4, 390	9, 170
Stake					75	
Square yards					49, 080	
Lines—						
Hand					8	
Hooks					16	
Trot, with baits or snoods						6
Baits or snoods						1, 950
Trot, with hooks					68	
Hooks					3, 400	
Cast nets					20	20
Otter trawls, shrimp			27		54	80
Yards at mouth			540		1, 080	1, 736
Pots, crab						30
Tongs					46	20
Rakes					6	
Grabs					84	

Fisheries of Georgia, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Liberty	Long	McIntosh	Screven	Tattnall	Wayne
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			2			
On boats and shore—						
Regular	22		51			
Casual		6	30	3	20	12
Total	22	6	83	3	20	12
Vessels:						
Motor—						
5 to 10 tons			1			
Total net tonnage			10			
Boats:						
Motor	1		19		1	
Other	20	3	32	3	18	12
Apparatus:						
Gill nets—						
Anchor		6		3		
Square yards		1, 180		1, 400		
Drift			13			12
Square yards			13, 300			2, 184
Runaround			3			
Square yards			750			
Stake					30	
Square yards					5, 460	
Fyke nets			60			
Otter trawls, shrimp	1		20			
Yards at mouth	18		400			
Tongs	20		22			

CATCH: BY COUNTIES

Species	Bryan		Bullock		Camden		Charlton	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Hickory shad	2, 900	$232	700	$56	1, 200	$96		
Menhaden					24, 701, 250	94, 100		
Shad	43, 400	8, 680	2, 800	360	18, 500	3, 700	12, 300	$2, 460
Shrimp					1, 052, 000	41, 980		
Total	46, 300	8, 912	3, 500	416	25, 772, 950	139, 876	12, 300	2, 460

Species	Chatham		Glynn		Liberty		Long	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bluefish	1, 012	$227						
Catfish and bullheads	16, 000	740						
Croaker	3, 200	64	12, 300	$246				
Drum:								
Black			1, 000	30				
Red or redfish			5, 250	210				
Flounders	300	15	8, 500	598				
Groupers	7, 354	441						
Grunts	390	32						
Hickory shad	6, 500	490	7, 700	616			600	$48
Jewfish	4, 629	232						
King whiting or "kingfish"	15, 000	300	23, 250	1, 163				
Mullet	91, 500	5, 440	76, 300	3, 815				
Sea bass	20, 840	2, 005	2, 000	80				
Shad	95, 005	19, 001	71, 500	14, 300			2, 100	420
Sheepshead			700	42				
Snapper:								
Mangrove	200	16						
Red	29, 854	2, 462						
Spot	2, 000	20	9, 950	199				
Squeteagues or "sea trout":								
Gray	1, 000	30	2, 000	100				
Spotted	150	12	48, 300	3, 880				

Fisheries of Georgia, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Chatham		Glynn		Liberty		Long	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Striped bass	500	$100						
Sturgeon	1,500	300						
Crabs, hard			228,000	$4,560				
Shrimp	2,897,614	114,904	3,642,098	145,684	54,000	$2,160		
Clams, hard, public	2,240	350						
Oysters:								
Market, public, spring	10,140	690	4,408	300				
Market, public, fall	3,527	240	17,634	1,200				
Market, private, spring	33,075	1,423			17,634	2,000		
Market, private, fall	57,537	3,005						
Terrapin, diamond-back	14,500	4,000	5,200	1,040				
Total	3,315,567	156,539	4,166,090	178,063	71,634	4,160	2,700	$468

Species	McIntosh		Screven		Tattnall		Wayne	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Catfish and bullheads	212,000	$6,360						
Hickory shad	3,800	304			1,200	$96	900	$72
Mullet	9,000	540						
Shad	12,000	2,400	1,900	$380	11,250	2,250	4,000	800
Sturgeon	3,000	600						
Shrimp	1,207,000	29,848						
Oysters, market, public, spring	15,430	1,750						
Total	1,462,230	41,802	1,900	380	12,450	2,346	4,900	872

Industries related to the fisheries of Georgia, 1930

WHOLESALE AND MANUFACTURING

Operating Units, Salaries, and Wages

Item	Camden County	Chatham County	Glynn County	Liberty County	McIntosh County	Total
Establishments	4	13	6	3	3	29
Persons engaged:						
Proprietors	2	11	6	3	3	25
Salaried employees	4	20	2	1		27
Wage earners—						
Average for season	212	292	336	33	217	1,090
Average for year	92	198	74	9	34	407
Paid to salaried employees	$5,000	$61,040	$6,700	$900	$1,901	$75,541
Paid to wage earners	40,850	72,611	40,639	4,753	19,051	177,904
Total salaries and wages	45,850	133,651	47,339	5,653	20,952	253,445

Products Manufactured

Item		Quantity	Value
Shrimp, canned	standard cases	75,744	$437,741
Oysters, canned	do	4,293	19,747
Miscellaneous [1]		(2)	172,180
Total			629,668

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[1] Includes cooked peeled shrimp, crab meat, canned clam chowder, canned terrapin soup and meat, menhaden products; and fresh-shucked oysters.

[2] Data not available.

Note.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore they can not be correlated directly with the catch within the State.

FLORIDA

Fisheries of Florida, 1930

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines		Gill nets			
	Menhaden	Other	Common	Long	Anchor	Drift	Run-around	Stake
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	226	20						
On boats and shore—								
Regular	48		831	297	21	206	2,141	
Casual			32			60	24	2
Total	274	20	863	297	21	266	2,165	2
Vessels:								
Motor—								
11 to 20 tons	2	1						
31 to 40 tons	2							
41 to 50 tons	1	1						
51 to 60 tons	1							
61 to 70 tons	1							
81 to 90 tons	1							
151 to 160 tons	1							
Total	9	2						
Net tonnage	510	54						
Boats:								
Motor	8		142	104	7	71	962	
Other			124	146		138	1,738	2
Accessory boats	19	2						
Apparatus:								
Number	17	2	173	80	42	212	2,213	2
Length, yards	4,960	600	64,220	64,200				
Square yards					25,200	330,450	2,812,854	1,080

Item	Trammel nets	Lines				Pound nets	Fyke nets	Dip nets	
		Hand	Troll	Trot, with baits or snoods	Trot, with hooks			Common	Drop
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels		573							
On boats and shore—									
Regular	222	625	871	8	233	56	50	44	
Casual		383	86		8			18	31
Total	222	1,581	957	8	241	56	50	62	31
Vessels:									
Motor—									
5 to 10 tons		12							
11 to 20 tons		17							
21 to 30 tons		4							
31 to 40 tons		2							
41 to 50 tons		8							
51 to 60 tons		6							
61 to 70 tons		12							
71 to 80 tons		3							
91 to 100 tons		1							
101 to 110 tons		1							
Total		66							
Net tonnage		2,385							
Sail—									
51 to 60 tons		1							
61 to 70 tons		3							
131 to 140 tons		1							
141 to 150 tons		1							
Total		6							
Net tonnage		527							
Total vessels		72							
Total net tonnage		2,912							
Boats:									
Motor	110	303	552	6	17	21	13	30	15
Other	120	380	4	2	218	24	37	42	
Apparatus:									
Number	180	1,579	1,309	8	241	52	2,950	62	31
Square yards	129,568								
Hooks, baits, or snoods		2,809	1,814	1,700	106,740				

Fisheries of Florida, 1930—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Cast nets	Otter trawls, shrimp	Wire baskets	Pots			Spears	Dredges clam
				Crab	Eel	Sea crawfish		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	-------	51	-------	-------	-------	-------	-------	-------
On boats and shore—								
Regular	-------	703	37	17	2	89	7	12
Casual	44	10	8	2	-------	-------	19	-------
Total	44	764	45	19	2	89	26	12
Vessels:								
Motor—								
5 to 10 tons	-------	11	-------	-------	-------	-------	-------	-------
11 to 20 tons	-------	11	-------	-------	-------	-------	-------	-------
Total	-------	22	-------	-------	-------	-------	-------	-------
Net tonnage	-------	236	-------	-------	-------	-------	-------	-------
Boats:								
Motor	-------	305	-------	13	2	68	-------	-------
Other	19	-------	45	12	-------	29	-------	-------
Apparatus:								
Number	44	327	520	1, 383	90	2, 533	26	1
Yards at mouth	-------	5, 689	-------	-------	-------	-------	-------	-------

Item	Dredges, scallop	Tongs	Forks	Hooks		Diving outfits	By hand	Total, exclusive of duplication
				Sea crawfish	Sponge			
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	-------	-------	-------	-------	-------	-------	-------	867
On boats and shore—								
Regular	3	389	46	50	334	412	39	6, 176
Casual	-------	31	12	-------	-------	-------	96	737
Total	3	420	58	50	334	412	135	7, 780
Vessels:								
Motor—								
5 to 10 tons	-------	-------	-------	-------	-------	-------	-------	23
11 to 20 tons	-------	-------	-------	-------	-------	-------	-------	30
21 to 30 tons	-------	-------	-------	-------	-------	-------	-------	4
31 to 40 tons	-------	-------	-------	-------	-------	-------	-------	4
41 to 50 tons	-------	-------	-------	-------	-------	-------	-------	10
51 to 60 tons	-------	-------	-------	-------	-------	-------	-------	7
61 to 70 tons	-------	-------	-------	-------	-------	-------	-------	13
71 to 80 tons	-------	-------	-------	-------	-------	-------	-------	3
81 to 90 tons	-------	-------	-------	-------	-------	-------	-------	1
91 to 100 tons	-------	-------	-------	-------	-------	-------	-------	1
101 to 110 tons	-------	-------	-------	-------	-------	-------	-------	1
151 to 160 tons	-------	-------	-------	-------	-------	-------	-------	1
Total	-------	-------	-------	-------	-------	-------	-------	98
Net tonnage	-------	-------	-------	-------	-------	-------	-------	3, 174
Sail—								
51 to 60 tons	-------	-------	-------	-------	-------	-------	-------	1
61 to 70 tons	-------	-------	-------	-------	-------	-------	-------	3
131 to 140 tons	-------	-------	-------	-------	-------	-------	-------	1
141 to 150 tons	-------	-------	-------	-------	-------	-------	-------	1
Total	-------	-------	-------	-------	-------	-------	-------	6
Net tonnage	-------	-------	-------	-------	-------	-------	-------	527
Total vessels	-------	-------	-------	-------	-------	-------	-------	104
Total net tonnage	-------	-------	-------	-------	-------	-------	-------	3, 701
Boats:								
Motor	1	131	3	50	-------	55	-------	2, 332
Other	-------	176	20	25	283	-------	32	3, 220
Accessory boats	-------	-------	-------	-------	-------	-------	-------	21
Apparatus:								
Number	2	420	58	2, 000	283	55	-------	-------
Yards at mouth	2	-------	-------	-------	-------	-------	-------	-------

Fisheries of Florida, 1930—Continued

CATCH: BY GEAR

Species	Purse seines				Haul seines			
	Menhaden		Other		Common		Long	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives							362,800	$5,442
Black bass					15,899	$1,490	193,308	19,174
Bluefish					251,204	7,054		
Blue runner or hardtail					59,071	720		
Bonito					1,190	24		
Catfish and bullheads					396,056	16,874	2,902,291	124,824
Cigarfish					58,412	1,752		
Crappie					3,674	239	653,670	26,321
Crevalle					14,274	271		
Croaker					14,685	278		
Drum:								
Black					5,627	139		
Red or redfish					149,974	4,732	603	30
Flounders					48,848	2,044		
Hickory shad							28,428	852
Kingfish or "king mackerel"					5,479	144		
King whiting or "kingfish"					29,053	966		
Menhaden	39,863,848	$169,956			50,322	1,490		
Mojarro					44,275	1,208		
Mullet			50,000	$1,500	3,843,223	119,396		
Permit					11,450	325		
Pigfish					18,480	545		
Pinfish or sailors choice					200	6		
Pompano					66,690	11,528		
Sea bass					1,320	36		
Shad					295,000	35,400	143,647	17,316
Sheepshead					147,032	4,450		
Snapper, mangrove					21,549	617		
Snook or sergeantfish					240,644	6,673		
Spadefish					48,528	1,444		
Spanish mackerel					1,068.972	44,318		
Spot					9,530	246		
Squeteagues or "sea trout":								
Gray					13,133	700		
Spotted					415,838	27,837		
Sunfish					7,117	214	342,392	10,290
Tenpounder					158,689	4,595		
Yellowtail					400	20		
Turtles, soft-shell							11,578	235
Total	39.863,848	169,956	50,000	1,500	7,515,838	297,775	4,638,717	204,484

Species	Gill nets							
	Anchor		Drift		Runaround		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack					220	$11		
Bluefish			9,732	$708	683,954	44,188		
Blue runner or hardtail					77,834	1,510		
Catfish and bullheads					58,414	2,976		
Crevalle					74,862	2,134		
Croaker					16,835	412		
Drum:								
Black					27,017	700		
Red or redfish			1,000	50	630,191	20,720		
Eels					600	40		
Flounders					42,844	2,144		
Groupers					5,000	400		
Hickory shad			1,188	36				
Kingfish or "king mackerel"					29,480	2,340		
King whiting or "kingfish"			30,000	1,200	37,000	1,197		
Mojarro					35,000	1,200		
Mullet			98,111	4,853	17,225,111	518,878		
Muttonfish					44,035	2,703		
Permit					3,432	124		
Pigfish					43,675	1,056		
Pinfish or sailors choice					77,410	1,498		
Pompano					192,894	40,369		
Shad			439,384	75,963			1,701	$335
Sharks	2,187,500	$3,500						
Sheepshead					502,007	16,695		

Fisheries of Florida, 1930—Continued

CATCH: BY GEAR—Continued

Species	Gill nets							
	Anchor		Drift		Runaround		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Snapper:								
Mangrove					59,931	$2,414		
Red					2,094	209		
Snook or sergeantfish					104,485	3,792		
Spadefish					33	1		
Spanish mackerel			9,892	$540	4,913,459	240,510		
Spot					133,026	3,766		
Squeteagues or "sea trout":								
Gray			1,200	120	510,458	36,870		
Spotted					1,503,508	105,300		
Sturgeon			3,191	310	4,207	765		
Tenpounder					22,672	618		
Yellowtail					400	16		
Crabs, hard					600	210		
Turtles, green	21,550	$1,078						
Total	2,209,050	4,578	593,698	83,780	27,062,688	1,055,766	1,701	$335

Species	Trammel nets		Lines					
			Hand		Troll		Trot, with baits or snoods	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack			21,000	$656				
Bluefish	2,210	$84	7,200	720	137,200	$10,944		
Blue runner or hardtail			2,200	40				
Cabio or crab eater			7,761	344				
Cero					9,950	480		
Crevalle			1,000	50	220	4		
Dolphin			5,000	500				
Drum:								
Black			1,980	54				
Red or redfish	15,598	550	206,326	7,376				
Flounders	2,145	135	700	28				
Groupers			3,059,582	91,788				
Grunts			21,883	657				
Hogfish			2,000	100				
Jewfish			26,050	782				
Kingfish or "king mackerel"					3,592,500	169,336		
King whiting or "kingfish"	880	24	3,000	120				
Mullet	775,342	23,261						
Muttonfish			176,004	12,443	5,000	300		
Pinfish or sailors choice			440	20				
Pompano	307,639	58,704						
Porgies			54,233	1,627				
Porkfish			600	36				
Sea bass			47,320	3,170				
Sheepshead	13,909	574	206,265	7,943				
Snapper:								
Mangrove			39,460	1,784				
Red			5,033,608	426,931				
Snook or sergeantfish			22,980	810				
Spanish mackerel			33,695	1,820	48,997	3,430		
Squeteagues or "sea trout":								
Gray			72,709	5,515				
Spotted	77,971	5,747	674,937	55,060				
Tripletail			4,869	168				
Turbot			900	54				
Yellowtail			88,670	6,635				
Crabs, hard							68,200	$2,816
Total	1,195,694	89,079	9,822,372	627,231	3,793,867	184,494	68,200	2,816

Fisheries of Florida, 1930—Continued

CATCH: BY GEAR—Continued

Species	Lines—Trot, with hooks		Pound nets		Fyke nets		Dip nets—Common	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			2,932	$44				
Black bass					123,879	$10,951		
Bluefish			62,047	2,256				
Blue runner or hardtail			615,140	11,730				
Cabio or crab eater			2,546	93				
Catfish and bullheads	608,900	$29,227	235,640	11,445	32,400	1,428		
Crappie			25,340	1,520	216,292	6,309		
Drum, red or redfish			18,892	515				
Groupers			220	6				
Kingfish or "king mackerel"			58,406	3,186				
Menhaden			500,000	5,000				
Mullet			1,019	30				
Pompano			6,130	1,115				
Porgies			800	16				
Sheepshead			2,920	106				
Snapper, mangrove			880	32				
Spanish mackerel			65,202	3,557				
Squeteagues or "sea trout": Spotted			118,312	8,597				
Sturgeon			1,012	184				
Sunfish			36,480	1,094	48,194	1,415		
Sea crawfish or spiny lobster							140,333	$11,227
Total	608,900	29,227	1,753,918	50,526	420,765	20,133	140,333	11,227

Species	Dip nets—Drop		Cast nets		Otter trawls, shrimp		Wire baskets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads							112,530	$6,138
Croaker					1,500	$45		
Drum, red or redfish					1,300	60		
Eels							543	16
Flounders					4,700	199		
King whiting or "kingfish"					53,200	1,658		
Mojarro			2,000	$100				
Mullet			29,000	1,550				
Squeteagues or "sea trout": Gray					1,700	150		
Crabs, hard	4,095	$117						
Sea crawfish or spiny lobster	10,000	1,000						
Shrimp					16,848,576	635,506		
Total	14,095	1,117	31,000	1,650	16,910,976	637,618	113,073	6,154

Species	Pots						Spears	
	Crab		Eel		Sea crawfish			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels			16,000	$800				
Flounders							20,374	$1,702
Crabs:								
Hard	38,400	$960						
Stone	190,050	12,670			114,500	$13,660		
Sea crawfish or spiny lobster					137,976	14,504		
Total	228,450	13,630	16,000	800	252,476	28,164	20,374	1,702

Species	Dredges				Tongs		Forks	
	Clam		Scallop					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:								
Hard, public	565,528	$35,346			21,000	$1,050	97,928	$7,630
Hard, private					21,000	1,050		
Oysters:								
Market, public, spring					723,697	46,342		
Market, public, fall					808,603	75,739		
Market, private, spring					11,237	1,213		
Market, private, fall					14,478	1,563		
Scallops, bay			3,975	$188				
Total	565,528	35,346	3,975	188	1,600,015	126,957	97,928	7,630

Fisheries of Florida, 1930—Continued

CATCH: BY GEAR—Continued

Species	Hooks				Diving outfits		By hand	
	Sea crawfish		Sponge					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, stone	3, 000	$300						
Clams:								
Hard, public							3, 432	$514
Hard, private							2, 688	840
Conches			20, 000	$200				
Oysters:								
Market, public, spring							66, 471	5, 126
Market, public, fall							69, 639	5, 365
Market, private, spring							24, 308	1, 850
Market, private, fall							64, 820	5, 000
Scallops, bay							17, 892	1, 951
Terrapin, diamond-back							406	83
Sponges:								
Grass			76, 718	24, 572	6, 200	$1, 984		
Sheepswool			98, 513	182, 458	271, 952	676, 241		
Velvet			682	409				
Wire			490	110	3, 291	1, 931		
Yellow			39, 015	12, 709	52, 140	30, 246		
Total	3, 000	300	235, 418	220, 458	333, 583	710, 402	249, 656	20, 72

OPERATING UNITS: BY COUNTIES

Item	Bay	Brevard	Broward	Charlotte	Citrus	Clay	Collier	Dade
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	135							20
On boats and shore—								
Regular	185	156	5	331	132	49	92	360
Casual	27	28	50	46	26		25	25
Total	347	184	55	377	158	49	117	405
Vessels:								
Motor—								
5 to 10 tons	5							
11 to 20 tons	5							1
21 to 30 tons	2							
41 to 50 tons	1							1
61 to 70 tons	3							
Total	16							2
Net tonnage	391							54
Boats:								
Motor	48	92	29	168	47	14	45	225
Other	67	109		324	145	31	61	60
Accessory boats								2
Apparatus:								
Purse seines—								
Other								2
Length, yards								600
Haul seines—								
Common	14			19		14	4	
Length, yards	5, 400			7, 200		11, 600	1, 100	
Gill nets—								
Runaround	16	136		329	85		52	80
Square yards	9, 900	126, 450		374, 000	49, 732		50, 230	200, 000
Trammel nets	3			25			8	
Square yards	1, 650			24, 195			16, 000	
Lines—								
Hand	185	6	20	64	32		27	55
Hooks	359	12	20	64	32		27	55
Troll		35	50	81	2			230
Hooks		35	60	81	2			460
Trot, with hooks		2				44		
Hooks		600				20, 400		
Dip nets, drop								25
Otter trawls, shrimp	1	13						
Yards at mouth	10	260						
Pots—								
Crab		38						
Sea crawfish			240					2, 000
Spears	7							
Dredges, clam							1	
Tongs	62			4	38			
Forks							15	
Hooks, sea crawfish								2, 000

Fisheries of Florida, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Dixie	Duval	Escambia	Franklin	Glades	Gulf	Hendry	Hillsborough
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		10	329	26		60		15
On boats and shore—								
Regular	20	197	174	497	122	123	5	84
Casual	8	50	6	14		6		8
Total	28	257	509	537	122	189	5	107
Vessels:								
Motor—								
5 to 10 tons		1		6				
11 to 20 tons		1	4	1				3
21 to 30 tons			1					
31 to 40 tons						1		
41 to 50 tons			7					
51 to 60 tons			6					
61 to 70 tons			9			1		
71 to 80 tons			3					
91 to 100 tons			1					
101 to 110 tons			1					
Total		2	32	7		2		3
Net tonnage		18	1,744	51		96		36
Sail—								
51 to 60 tons			1					
61 to 70 tons			3					
131 to 140 tons			1					
141 to 150 tons			1					
Total			6					
Net tonnage			527					
Total vessels		2	38	7		2		3
Total net tonnage		18	2,271	51		96		36
Boats:								
Motor	5	81	53	181	41	21	2	34
Other	28	121	34	102	44	8	3	67
Apparatus:								
Purse seines—								
Menhaden						10		
Length, yards						2,960		
Haul seines—								
Common		12	5	10		8		
Length, yards		3,000	1,770	3,750		3,200		
Long					19		1	
Length, yards					18,000		900	
Gill nets—								
Drift		143		6				
Square yards		200,200		6,000				
Runaround	15	17	12	33		9		50
Square yards	5,375	23,800	72,000	21,090		24,000		37,085
Trammel nets			26					
Square yards			13,520					
Lines—								
Hand	28	35	393	57		6		42
Hooks	28	70	1,115	114		6		63
Trot, with baits or snoods		6						
Baits or snoods		900						
Trot, with hooks		38		20	1			
Hooks		12,400		1,800	500			
Pound nets						3		
Fyke nets					1,700	100		
Dip nets, drop			6					
Cast nets		25						
Otter trawls, shrimp		16	4	65				
Yards at mouth		320	48	771				
Wire baskets				520				
Spears				9				
Dredges, scallop				2				
Yards at mouth				2				
Tongs			29	196				

Fisheries of Florida, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Indian River	Jefferson	Lee	Levy	Manatee	Martin	Monroe	Nassau
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels							5	179
On boats and shore—								
Regular	54	11	88	153	119	30	493	121
Casual		8	42	28	8	10	18	23
Total	54	19	130	181	127	40	516	323
Vessels:								
Motor—								
5 to 10 tons							1	3
11 to 20 tons								5
31 to 40 tons								1
41 to 50 tons								1
51 to 60 tons								1
81 to 90 tons								1
151 to 160 tons								1
Total							1	13
Net tonnage							6	475
Boats:								
Motor	30	3	56	68	56	20	146	38
Other	29	18	113	149	94	5	333	41
Accessory boats								19
Apparatus:								
Purse seines—								
Menhaden								7
Length, yards								2,000
Haul seines—								
Common			6		7			
Length, yards			2,100		1,850			
Gill nets—								
Anchor							42	
Square yards							25,200	
Drift								10
Square yards								2,250
Runaround	49	11	80	90	100	30	89	2
Square yards	47,700	6,425	58,190	36,365	126,200	36,000	166,150	1,800
Stake								2
Square yards								1,080
Trammel nets			4	12	7			
Square yards			5,000	2,025	4,640			
Lines—								
Hand	5	18	48	49	26		68	30
Hooks	10	18	48	49	26		68	60
Troll	30		24	20	30	20	102	
Hooks	30		24	20	30	40	102	
Pound nets				12				
Dip nets, common							62	
Otter trawls, shrimp								44
Yards at mouth								880
Pots—								
Crab					60			
Sea crawfish							253	
Tongs				33				
Forks					1			
Hooks, sponge							232	

Item	Okaloosa	Okeechobee	Palm Beach	Pasco	Pinellas	Putnam	St. Johns	St. Lucie
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					62		20	2
On boats and shore—								
Regular	120	37	250	28	805	244	210	184
Casual			18		119			
Total	120	37	268	28	986	244	230	186
Vessels:								
Motor—								
5 to 10 tons					2		4	
11 to 20 tons					4		4	1
21 to 30 tons					1			
31 to 40 tons					2			
Total					9		8	1
Net tonnage					172		99	16

Fisheries of Florida, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Okaloosa	Okeechobee	Palm Beach	Pasco	Pinellas	Putnam	St. Johns	St. Lucie
Boats:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Motor	29	8	130	14	167	80	77	92
Other	28	27	25	28	294	151	19	40
Apparatus:								
Haul seines—								
Common	14				10			
Length, yards	5, 600				4, 150			
Long		8				50		
Length, yards		6, 400				37, 700		
Gill nets—								
Drift					14	38	1	
Square yards					8, 400	113, 000	600	
Runaround	2		84	28	260		6	126
Square yards	712		168, 000	17, 460	451, 760		3, 000	207, 940
Trammel nets	32				3			
Square yards	17, 088				2, 250			
Lines—								
Hand	56				181		10	
Hooks	112				283		20	
Troll			210		86			168
Hooks			420		121			168
Trot, with hooks		2				36		
Hooks		600				11, 640		
Pound nets						37		
Fyke nets		1, 030				120		
Cast nets			15					
Otter trawls, shrimp							85	51
Yards at mouth							1, 700	740
Pots—								
Crab					1, 285			
Eel						90		
Sea crawfish							40	
Spears	2							
Tongs	2							6
Forks					12		15	
Hooks, sponge					51			
Diving outfits					55			

Item	Santa Rosa	Sarasota	Seminole	Taylor	Volusia	Wakulla	Walton
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					4		
On boats and shore—							
Regular	12	204	98	66	140	167	10
Casual	6	35		45	23	35	
Total	18	239	98	111	167	202	10
Vessels:							
Motor—							
5 to 10 tons					1		
11 to 20 tons					1		
Total					2		
Net tonnage					16		
Boats:							
Motor	6	101		16	64	42	3
Other	5	207	98	111	65	131	5
Apparatus:							
Haul seines—							
Common		24	20		2	4	
Length, yards		8, 400	3, 600		300	1, 200	
Long					2		
Length, yards					1, 200		
Gill nets—							
Runaround		220		62	23	117	
Square yards		390, 740		23, 450	17, 250	60, 050	
Trammel nets	5	10				40	5
Square yards	2, 200	25, 500				14, 000	1, 500

Fisheries of Florida, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Santa Rosa	Sarasota	Seminole	Taylor	Volusia	Wakulla	Walton
Apparatus—Continued.							
Lines—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Hand		41		85	12		
Hooks		41		85	24		
Troll		221					
Hooks		221					
Trot, with baits or snoods					2		
Baits or snoods					800		
Trot, with hooks			98				
Hooks			58, 800				
Cast nets					4		
Otter trawls, shrimp					48		
Yards at mouth					960		
Spears	8						
Tongs	8				30	12	
Forks					15		

CATCH: BY COUNTIES

Species	Bay		Brevard		Broward		Charlotte	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bluefish	143, 902	$2, 904	83, 230	$6, 363	2, 000	$200	93, 025	$5, 197
Blue runner or hardtail	4, 950	90					18, 535	341
Bonito							990	18
Cabio or crab eater							6, 545	298
Catfish and bullheads			32, 000	1, 280				
Cigarfish	30, 000	900						
Crevalle			4, 200	126	1, 000	50	11, 880	221
Croaker			1, 500	45			5, 885	120
Dolphin					5, 000	500		
Drum:								
Black			7, 515	220			440	12
Red or redfish	5, 230	167	43, 585	2, 043			171, 590	6, 918
Flounders	3, 850	252	1, 700	44			32, 230	1, 178
Groupers	711, 571	21, 350			10, 000	300	5, 720	172
Grunts							4, 300	129
Jewfish							2, 600	78
Kingfish or "king mackerel"			1, 800	90	140, 000	8, 100	37, 114	1, 707
King whiting or "kingfish"			10, 100	354			7, 040	192
Menhaden	25, 000	750						
Mojarro							44, 275	1, 208
Mullet	544, 328	18, 078	1, 379, 870	35, 075			3, 762, 776	112, 883
Muttonfish					5, 000	750	24, 804	1, 057
Permit							12, 352	370
Pigfish			4, 189	84			16, 880	506
Pinfish or sailors choice			52, 270	895				
Pompano	1, 354	246	13, 256	2, 816			128, 587	23, 146
Porgies	8, 800	264						
Sheepshead	5, 665	172	69, 698	2, 172			158, 115	5, 885
Snapper:								
Mangrove			1, 500	75			37, 939	1, 140
Red	870, 940	69, 678						
Snook or sergeantfish			4, 000	160			94, 644	2, 581
Spadefish							46, 306	1, 389
Spanish mackerel	533, 407	20, 350	26, 000	1, 820	500	75	458, 062	20, 826
Spot			62, 808	1, 592			5, 830	159
Squeteagues or "sea trout":								
Gray			332, 619	22, 787				
Spotted	62, 346	4, 374					613, 888	43, 044
Tenpounder	90, 000	2, 700						
Tripletail							1, 100	40
Yellowtail							6, 600	312
Crabs, hard			39, 000	1, 170				
Sea crawfish or spiny lobster					15, 000	3, 000		
Shrimp	10, 000	800	405, 000	16, 200				
Oysters:								
Market, public, spring	70, 932	5, 994					4, 250	375
Market, public, fall	92, 582	8, 169					7, 140	525
Total	3, 214, 857	157, 238	2, 575, 840	95, 411	178, 500	12, 975	5, 821, 442	232, 027

Fisheries of Florida, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Citrus		Clay		Collier		Dade	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Amberjack							2, 500	$100
Black bass			15, 899	$1, 490				
Bluefish	7, 855	$286			1, 925	$88	15, 000	1, 500
Blue runner or hardtail					15, 675	285	7, 000	140
Catfish and bullheads			444, 708	19, 397				
Cero							5, 000	300
Crappie			3, 674	239				
Crevalle					1, 650	30	5, 000	150
Drum:								
Black					440	12		
Red or redfish	54, 682	1, 491			90, 640	2, 472	7, 000	280
Flounders	682	37			880	38		
Groupers	2, 250	68			3, 500	105	30, 000	900
Grunts					2, 500	75	7, 000	210
Hogfish							2, 000	100
Jewfish					400	12	8, 000	240
Kingfish or "king mackerel"	1, 896	103					900, 000	40, 500
King whiting or "kingfish"					1, 650	30		
Mullet	1, 150, 695	34, 521			771, 344	15, 427	450, 000	9, 500
Muttonfish							100, 000	7, 000
Permit					880	24		
Pigfish	660	18			2, 300	69		
Pompano	198	36			75, 930	15, 186	8, 000	1, 600
Porgies							8, 000	240
Sheepshead	13, 676	505			106, 132	3, 037	2, 000	80
Snapper:								
Mangrove	12, 633	345					3, 000	180
Red							14, 000	1, 120
Snook or sergeantfish					50, 283	1, 371		
Spanish mackerel	1, 320	72			159, 049	7, 230	900, 000	45, 000
Spot					440	8		
Squeteagues or "sea trout":								
Gray							24, 000	2, 400
Spotted	131, 416	10, 247			79, 838	4, 860		
Sunfish			7, 117	214				
Tenpounder	22, 491	613						
Tripletail					440	12		
Yellowtail					4, 900	245	40, 000	3, 200
Crabs, stone							103, 000	12, 800
Sea crawfish or spiny lobster							90, 000	9, 000
Clams, hard, public					645, 528	40, 346		
Oysters:								
Market, public, spring	18, 923	1, 270						
Market, public, fall	57, 410	3, 853						
Total	1, 476, 787	53, 465	471, 398	21, 340	2, 016, 324	90, 962	2, 730, 500	136, 540

Species	Dixie		Duval		Escambia		Franklin	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Amberjack			220	$11			1, 400	$42
Bluefish	2, 640	$96	4, 500	450	46, 215	$1, 337	63, 685	2, 252
Blue runner or hardtail					25, 931	236	2, 200	40
Cabio or crab eater					314	13		
Catfish and bullheads			69, 000	3, 450			218, 592	11, 086
Crevalle			233	10				
Croaker			3, 000	90	2, 200	40		
Drum:								
Black			2, 500	75	2, 107	57	440	12
Red or redfish	5, 280	192	3, 000	190	6, 633	181	29, 585	813
Eels							543	16
Flounders	1, 650	90	1, 296	65	1, 556	113	10, 345	652
Groupers					1, 312, 024	39, 353	299, 226	8, 977
Jewfish					2, 095	63	1, 800	54
Kingfish or "king mackerel"					2, 439	44		
King whiting or "kingfish"			48, 700	1, 948	423	8	3, 300	90
Menhaden							7, 000	210
Mullet	132, 410	5, 296	97, 833	4, 892	363, 592	10, 908	960, 050	28, 801
Pigfish	500	15			660	12		
Pompano	2, 970	540	1, 133	226	10, 266	1, 867	1, 606	292
Porgies					9, 313	282	6, 000	180
Sea bass			44, 000	3, 080			1, 320	36

Fisheries of Florida, 1930—Continued

CATCH: By counties—Continued

Species	Dixie		Duval		Escambia		Franklin	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Shad			262, 875	$48, 817				
Sheepshead	5, 060	$230	1, 000	80	4, 423	$201	2, 183	$65
Snapper, red			10, 936	1, 093	2, 902, 878	256, 221	374, 761	30, 081
Snook or sergeantfish			1, 360	136				
Spadefish					62	1	220	4
Spanish mackerel	3, 740	204	3, 000	300	315, 941	9, 479	45, 236	1, 628
Spot	220	6	12, 960	390	80	1	440	12
Squeteagues or "sea trout":								
Gray			6, 200	520	66	1		
Spotted	38, 108	2, 771	26, 809	2, 680	9, 692	705	74, 380	5, 410
Sturgeon							3, 041	276
Tenpounder							17, 359	495
Tripletail							2, 009	80
Crabs, hard			48, 400	2, 420	4, 095	117		
Shrimp			1, 145, 714	45, 828	14, 718	1, 472	1, 564, 261	61, 853
Oysters:								
Market, public, spring					62, 492	5, 514	523, 637	29, 386
Market, public, fall					72, 830	6, 435	515, 577	51, 202
Scallops, bay							3, 975	188
Total	192, 578	9, 440	1, 794, 669	116, 751	5, 173, 045	334, 661	4, 734, 171	234, 233

Species	Glades		Gulf		Hendry		Hillsborough	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Black bass	155, 935	$14, 035			5, 400	$432		
Bluefish			77, 000	$2, 800			220	$12
Blue runner or hardtail			300, 000	6, 000				
Catfish and bullheads	1, 191, 330	47, 653			84, 000	3, 360		
Crappie	499, 410	14, 802			5, 100	153		
Crevalle							932	17
Croaker			880	8				
Drum, red or redfish			7, 700	280			36, 803	1, 346
Flounders			3, 850	185			17, 622	960
Groupers							209, 185	6, 282
Grunts							37	1
Kingfish or "king mackerel"			1, 100	50				
Menhaden			6, 123, 440	29, 076				
Mullet			411, 350	16, 454			542, 605	17, 278
Pompano			21, 102	2, 891			3, 175	597
Porgies							1, 200	36
Sheepshead			2, 750	100			21, 233	782
Snapper:								
Mangrove							660	18
Red							225, 123	18, 010
Snook or sergeantfish							24, 585	670
Spadefish							33	1
Spanish mackerel			248, 094	13, 532			1, 760	96
Spot			220	6			134	2
Squeteagues or "sea trout":								
Gray							2, 233	61
Spotted			34, 585	2, 563			136, 373	10, 108
Sunfish	103, 652	3, 109			8, 200	246		
Tenpounder			12, 000	240			181	5
Total	1, 950, 327	79, 599	7, 244, 071	74, 185	102, 700	4, 191	1, 224, 094	56, 282

Fisheries of Florida, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Indian River		Jefferson		Lee		Levy	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bluefish	6, 700	$804			4, 765	$217	89, 133	$3, 245
Blue runner or hardtail					990	18	320, 552	5, 828
Cabio or crab eater							2, 546	93
Crevalle	9, 800	294						
Croaker	3, 000	68			1, 650	30		
Drum:								
Black	3, 600	108					2, 640	72
Red or redfish	6, 300	287	10, 175	$370	49, 665	1, 355	76, 667	2, 091
Eels	600	40						
Flounders					2, 035	92	2, 970	162
Groupers							8, 710	261
Kingfish or "king mackerel"	4, 000	240			26, 769	1, 217	208, 103	11, 351
King whiting or "kingfish"	16, 500	570			440	8		
Mullet	300, 669	9, 020	171, 050	6, 862	756, 349	25, 744	892, 958	26, 788
Muttonfish	18, 000	720						
Pigfish	2, 800	84			1, 200	36		
Pinfish or sailors choice	11, 600	232						
Pompano	18, 233	4, 257			17, 600	3, 520	19, 957	3, 647
Porgies							1, 050	21
Sea bass							3, 320	90
Sheepshead	7, 300	292	4, 840	188	64, 361	1, 996	40, 979	1, 540
Snapper, mangrove	12, 400	739	990	36	2, 600	96	2, 930	112
Snook or sergeantfish	27, 000	1, 080			20, 582	561		
Spanish mackerel	22, 997	1, 610			89, 476	4, 067	79, 294	4, 411
Spot	42, 000	1, 260	220	6			704	13
Squeteagues or "sea trout":								
Gray	83, 695	8, 370						
Spotted			39, 138	2, 846	138, 838	7, 819	314, 947	23, 794
Sturgeon							5, 219	949
Yellowtail					1, 720	64		
Oysters:								
Market, public, spring					1, 275	112	12, 446	980
Market, public, fall					2, 550	225	15, 773	1, 242
Total	597, 194	30, 075	226, 413	10, 308	1, 182, 865	47, 177	2, 100, 898	86, 690

Species	Manatee		Martin		Monroe		Nassau	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bluefish	16, 207	$1, 131	32, 449	$4, 543	16, 720	$900	800	$80
Blue runner or hardtail	2, 090	38			11, 789	214		
Cabio or crab eater	660	24						
Cero					4, 950	180		
Crevalle	990	18	15, 000	600	1, 980	36		
Croaker	1, 320	36	500	15			100	4
Drum:								
Black	440	12	500	15	440	12		
Red or redfish	135, 918	4, 952	2, 000	80	22, 770	633	100	3
Flounders	990	54			550	25	3, 000	150
Groupers	2, 500	75			27, 000	810		
Grunts	400	12			5, 700	171		
Jewfish					8, 800	264		
Kingfish or "king mackerel"	5, 720	312	59, 585	2, 979	852, 340	31, 012		
King whiting or "kingfish"			600	24			20, 250	610
Menhaden							34, 242, 408	145, 920
Mojarro			15, 000	600				
Mullet	1, 402, 800	52, 352	364, 617	10, 939	524, 208	11, 884		
Muttonfish			24, 035	1, 923	46, 200	3, 636		
Permit	1, 100	40						
Pigfish	1, 000	40			600	18		
Pinfish or sailors choice					440	20		
Pompano	22, 980	4, 160	35, 004	8, 751	2, 382	325		
Porgies	800	24			1, 500	45		
Porkfish					600	36		
Shad							14, 301	2, 825
Sharks					2, 187, 500	3, 500		
Sheepshead	64, 790	2, 407	7, 530	452	21, 450	691		
Snapper:								
Mangrove	1, 760	64	5, 000	300	16, 500	900		
Red					27, 000	2, 160	7, 000	490
Snook or sergeantfish	65, 112	1, 887	3, 000	180				
Spanish mackerel	209, 981	11, 562			1, 136, 503	42, 255		
Spot	440	12	8, 000	320	880	32	200	8

Fisheries of Florida, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Manatee		Martin		Monroe		Nassau	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Squeteagues or "sea trout":								
Gray							2, 500	$250
Spotted	184, 859	$13, 845	11, 762	$1, 176	46, 156	$2, 663	15, 000	1, 500
Sturgeon							150	34
Tripletail					1, 320	36		
Turbot					900	54		
Yellowtail					36, 250	2, 850		
Crabs, stone	45, 000	3, 000			14, 500	1, 160		
Sea crawfish or spiny lobster					180, 000	14, 400		
Shrimp							3, 229, 533	129, 179
Clams:								
Hard, public	9, 600	1, 200						
Hard, private							2, 688	840
Conchs					20, 000	200		
Oysters:								
Market, public, spring							64, 224	4, 954
Market, public, fall							64, 820	5, 000
Market, private, spring							24, 308	1, 850
Market, private, fall							64, 820	5, 000
Turtles, green					21, 550	1, 078		
Sponges:								
Grass					20, 908	6, 710		
Sheepswool					50, 520	63, 121		
Velvet					682	409		
Wire					490	110		
Yellow					29, 814	7, 372		
Total	2, 177, 457	97, 257	584, 582	32, 897	5, 341, 892	199, 922	37, 756, 202	298, 697

Species	Okaloosa		Okeechobee		Palm Beach		Pasco	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Amberjack	100	$4						
Black bass			56, 166	$4, 493				
Bluefish	28, 861	866			226, 000	$18, 300	1, 760	$96
Blue runner or hardtail	18, 400	184			10, 000	200		
Bonito	200	6						
Catfish and bullheads			567, 200	22, 768				
Cigarfish	28, 412	852						
Crappie			143, 464	4, 304				
Crevalle					10, 000	300		
Croaker					2, 000	60		
Drum:								
Black	200	6						
Red or redfish	6, 344	302			1, 000	50	20, 350	555
Flounders	5, 119	425						
Groupers	51, 847	1, 555			5, 000	400		
Jewfish	700	21						
Kingfish or "king mackerel"	1, 500	30			655, 000	32, 750		
King whiting or "kingfish"	500	10			3, 000	90		
Menhaden	16, 322	490						
Mojarro					2, 000	100		
Mullet	236, 703	7, 101			14, 000	700	500, 752	15, 023
Muttonfish					7, 000	360		
Pompano	11, 269	2, 254			16, 500	3, 550		
Porgies	14, 970	449						
Sheepshead	3, 700	195			1, 000	40	880	32
Snapper:								
Mangrove					1, 500	75	7, 150	260
Red	34, 516	2, 761						
Snook or sergeantfish					2, 000	80		
Spadefish	400	8						
Spanish mackerel	160, 574	4, 817			650, 000	39, 000	4, 950	225
Spot	900	18						
Squeteagues or "sea trout":								
Gray					1, 500	120		
Spotted	23, 542	1, 727					17, 586	1, 279
Sunfish			47, 375	1, 421				
Tenpounder	32, 180	965						
Oysters, market, public, fall	5, 100	450						
Total	682, 359	25, 496	814, 205	32, 986	1, 607, 500	96, 175	553, 428	17, 470

Fisheries of Florida, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Pinellas		Putnam		St. Johns		St. Lucie	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	------	------	365, 732	$5, 486	------	------	------	------
Amberjack	17, 000	$510	------	------	------	------	------	------
Black bass	------	------	97, 286	10, 925	------	------	------	------
Bluefish	109, 826	6, 463	------	------	4, 350	$435	25, 000	$2, 750
Blue runner or hardtail	243	4	------	------	------	------	5, 000	100
Cabio or crab eater	242	9	------	------	------	------	------	------
Catfish and bullheads	------	------	1, 383, 401	66, 118	------	------	------	------
Crappie	------	------	241, 128	14, 519	------	------	------	------
Crevalle	1, 171	27	------	------	------	------	20, 000	400
Croaker	------	------	------	------	------	------	3, 000	60
Drum:								
Black	462	13	------	------	------	------	10, 000	200
Red or redfish	57, 022	1, 742	603	30	160	6	15, 000	300
Eels	------	------	16, 000	800	------	------	------	------
Flounders	8, 754	392	------	------	4, 800	197	------	------
Groupers	379, 742	11, 390	------	------	------	------	------	------
Grunts	146	5	------	------	------	------	------	------
Hickory shad	------	------	29, 616	888	------	------	------	------
Jewfish	1, 655	50	------	------	------	------	------	------
Kingfish or "king mackerel"	101, 268	5, 524	------	------	22, 000	1, 980	500, 000	25, 000
King whiting or "kingfish"	------	------	------	------	3, 250	97	10, 000	300
Mojarro	------	------	------	------	------	------	20, 000	600
Mullet	2, 127, 345	64, 893	5, 278	211	9, 500	475	------	------
Pigfish	3, 410	93	------	------	------	------	------	------
Pinfish or sailors choice	------	------	------	------	10, 000	300	------	------
Pompano	27, 272	4, 969	------	------	3, 200	640	40, 000	8, 000
Porgies	2, 500	75	------	------	------	------	------	------
Shad	------	------	306, 156	41, 692	1, 400	280	------	------
Sheepshead	27, 683	1, 085	------	------	5, 540	322	30, 000	1, 200
Snapper:								
Mangrove	8, 170	300	------	------	------	------	------	------
Red	566, 454	45, 317	------	------	2, 094	209	------	------
Snook or sergeantfish	15, 631	426	------	------	------	------	40, 000	1, 600
Spadefish	220	6	------	------	------	------	------	------
Spanish mackerel	392, 095	20, 300	------	------	640	64	425, 000	25, 500
Spot	440	12	------	------	------	------	------	------
Squeteagues or "sea trout":								
Gray	8, 767	259	------	------	------	------	15, 000	1, 200
Spotted	316, 633	24, 136	------	------	26, 050	2, 600	------	------
Sunfish	------	------	249, 839	7, 513	------	------	------	------
Tenpounder	7, 150	195	------	------	------	------	------	------
Crabs, stone	145, 050	9, 670	------	------	------	------	------	------
Sea crawfish or spiny lobster	------	------	------	------	3, 309	331	------	------
Shrimp	------	------	------	------	5, 743, 500	229, 740	2, 272, 450	63, 898
Clams, hard, public	4, 848	727	------	------	4, 152	778	------	------
Oysters:								
Market, public, spring	------	------	------	------	972	60	10, 371	1, 120
Market, public, fall	------	------	------	------	2, 269	140	10, 195	1, 155
Scallops, bay	15, 295	1, 657	------	------	------	------	------	------
Terrapin, diamond-back	------	------	------	------	406	83	------	------
Turtles, soft-shell	------	------	11, 578	235	------	------	------	------
Sponges:								
Grass	62, 010	19, 846	------	------	------	------	------	------
Sheepswool	319, 945	795, 578	------	------	------	------	------	------
Wire	3, 291	1, 931	------	------	------	------	------	------
Yellow	61, 341	35, 583	------	------	------	------	------	------
Total	4, 793, 081	1, 053, 187	2, 706, 617	148, 417	5, 847, 592	238, 737	3, 451, 016	133, 383

Species	Santa Rosa		Sarasota		Seminole		Taylor	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bluefish	------	------	25, 839	$1, 879	------	------	8, 580	$312
Blue runner or hardtail	------	------	9, 240	252	------	------	------	------
Catfish and bullheads	------	------	------	------	300, 000	$15, 000	------	------
Crevalle	------	------	1, 320	24	------	------	------	------
Croaker	------	------	3, 850	70	------	------	------	------
Drum:								
Black	------	------	1, 100	22	------	------	------	------
Red or redfish	3, 520	$160	79, 564	2, 195	------	------	32, 395	1, 178
Flounders	9, 262	840	4, 125	182	------	------	1, 650	90
Groupers	------	------	6, 527	196	------	------	------	------

Fisheries of Florida, 1930—Continued

CATCH: BY COUNTIES—Continued

Species	Santa Rosa		Sarasota		Seminole		Taylor	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Grunts	--------	--------	1, 800	$54	--------	--------	--------	--------
Kingfish or "king mackerel"	--------	--------	165, 231	12, 017	--------	--------	--------	--------
Mullet	143, 800	$4, 314	1, 521, 895	45, 657	--------	--------	360, 100	$14, 404
Permit	--------	--------	550	15	--------	--------	--------	--------
Pigfish	--------	--------	7, 490	217	--------	--------	--------	--------
Pompano	--------	--------	86, 744	17, 348	--------	--------	4, 180	760
Porgies	--------	--------	900	27	--------	--------	--------	--------
Shad	--------	--------	--------	--------	295, 000	$35, 400	--------	--------
Sheepshead	440	20	170, 147	4, 749	--------	--------	15, 950	725
Snapper, mangrove	--------	--------	3, 388	93	--------	--------	3, 300	90
Snook or sergeantfish	--------	--------	19, 912	543	--------	--------	--------	--------
Spadefish	--------	--------	1, 320	36	--------	--------	--------	--------
Spanish mackerel	--------	--------	269, 958	19, 632	--------	--------	2, 640	120
Spot	--------	--------	550	15	--------	--------	990	20
Squeteagues or "sea trout":								
Spotted	4, 180	380	169, 217	12, 298	--------	--------	108, 446	7, 587
Clams, hard, public	--------	--------	1, 760	264	--------	--------	--------	--------
Oysters:								
Market, public, spring	7, 208	636	--------	--------	--------	--------	--------	--------
Market, public, fall	13, 260	1, 170	--------	--------	--------	--------	--------	--------
Scallops, bay	--------	--------	2, 597	294	--------	--------	--------	--------
Total	181, 670	7, 520	2, 555, 024	118, 079	595, 000	50, 400	538, 231	25, 286

Species	Volusia		Wakulla		Walton	
	Pounds	Value	Pounds	Value	Pounds	Value
Black bass	2, 400	$240	--------	--------	--------	--------
Bluefish	400	40	14, 960	$408	--------	--------
Blue runner or hardtail	--------	--------	1, 650	30	--------	--------
Catfish and bullheads	56, 000	2, 800	--------	--------	--------	--------
Crappie	6, 200	372	--------	--------	--------	--------
Crevalle	5, 200	156	--------	--------	--------	--------
Croaker	1, 200	36	2, 935	53	--------	--------
Drum:						
Black	1, 800	45	--------	--------	--------	--------
Red or redfish	7, 816	292	33, 137	1, 004	1, 650	$75
Flounders	200	8	330	9	165	12
King whiting or "kingfish"	26, 500	810	--------	--------	880	24
Mullet	281, 800	8, 754	1, 750, 729	52, 522	90, 400	2, 712
Pigfish	20, 466	409	--------	--------	--------	--------
Pinfish or sailors choice	3, 740	77	--------	--------	--------	--------
Pompano	400	80	--------	--------	55	12
Sheepshead	1, 100	44	11, 188	421	1, 320	60
Snapper, mangrove	400	24	--------	--------	--------	--------
Spot	4, 100	120	--------	--------	--------	--------
Squeteagues or "sea trout":						
Gray	122, 620	7, 387	--------	--------	--------	--------
Spotted	--------	--------	155, 502	11, 309	11, 275	820
Sunfish	18, 000	540	--------	--------	--------	--------
Crabs, hard	19, 800	396	--------	--------	--------	--------
Shrimp	2, 463, 400	86, 536	--------	--------	--------	--------
Clams:						
Hard, public	22, 000	1, 225	--------	--------	--------	--------
Hard, private	21, 000	1, 050	--------	--------	--------	--------
Oysters:						
Market, public, spring	5, 618	607	7, 820	460	--------	--------
Market, public, fall	8, 859	957	9, 877	581	--------	--------
Market, private, spring	11, 237	1, 213	--------	--------	--------	--------
Market, private, fall	14, 478	1, 563	--------	--------	--------	--------
Total	3, 126, 734	115, 781	1, 988, 128	66, 797	105, 745	3, 715

Fisheries of Florida, 1930—Continued

CATCH: BY DISTRICTS

Species	East Coast		West Coast		Lake Okeechobee	
	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	365, 732	$5, 486				
Amberjack	2, 720	111	18, 500	$556		
Black bass	115, 585	12, 655			217, 501	$18, 960
Bluefish	400, 429	35, 465	753, 118	30, 489		
Blue runner	22, 000	440	732, 245	13, 560		
Bonito			1, 190	24		
Cabio			10, 307	437		
Catfish and bullheads	2, 285, 109	108, 045	218, 592	11, 086	1, 842, 530	73, 781
Cero	5, 000	300	4, 950	180		
Cigarfish			58, 412	1, 752		
Crappie	251, 002	15, 130			647, 974	19, 259
Crevalle	70, 433	2, 086	19, 923	373		
Croaker	14, 300	378	18, 720	357		
Dolphin	5, 000	500				
Drum:						
Black	25, 915	663	8, 709	230		
Red or redfish	86, 564	3, 561	937, 320	30, 472		
Eels	16, 600	840	543	16		
Flounders	10, 996	464	108, 615	5, 788		
Groupers	45, 000	1, 600	3, 019, 802	90, 594		
Grunts	7, 000	210	14, 883	447		
Hickory shad	29, 616	888				
Hogfish	2, 000	100				
Jewfish	8, 000	240	18, 050	542		
Kingfish or "king mackerel"	2, 282, 385	111, 639	1, 403, 480	63, 367		
King whiting or "kingfish"	138, 900	4, 803	14, 233	362		
Menhaden	34, 242, 408	145, 920	6, 171, 762	30, 526		
Mojarro	37, 000	1, 300	44, 275	1, 208		
Mullet	2, 903, 567	79, 566	19, 118, 239	589, 902		
Muttonfish	154, 035	10, 753	71, 004	4, 693		
Permit			14, 882	449		
Pigfish	27, 455	577	34, 700	1, 024		
Pinfish or sailors choice	77, 610	1, 504	440	20		
Pompano	135, 726	29, 920	437, 627	81, 796		
Porgies	8, 000	240	47, 033	1, 403		
Porkfish			600	36		
Sea bass	44, 000	3, 080	4, 640	126		
Shad	879, 732	129, 014				
Sharks			2, 187, 500	3, 500		
Sheepshead	125, 168	4, 682	746, 965	25, 086		
Snapper:						
Mangrove	23, 800	1, 393	98, 020	3, 454		
Red or redfish	34, 030	2, 912	5, 001, 672	424, 228		
Snook or sergeantfish	77, 360	3, 236	290, 749	8, 039		
Spadefish			48, 561	1, 445		
Spanish mackerel	2, 028, 137	113, 369	4, 112, 080	180, 806		
Spot	130, 068	3, 690	12, 488	322		
Squeteagues or "sea trout":						
Gray	588, 134	43, 034	11, 066	321		
Spotted	79, 621	7, 956	2, 710, 945	194, 585		
Sturgeon	150	34	8, 260	1, 225		
Sunfish	274, 956	8, 267			159, 227	4, 776
Tenpounder			181, 361	5, 213		
Tripletail			4, 869	168		
Turbot			900	54		
Yellowtail	40, 000	3, 200	49, 470	3, 471		
Crabs:						
Hard	107, 200	3, 986	4, 095	117		
Stone	103, 000	12, 800	204, 550	13, 830		
Sea crawfish or spiny lobster	108, 309	12, 331	180, 000	14, 400		
Shrimp	15, 259, 597	571, 381	1, 588, 979	64, 125		
Clams:						
Hard, public	26, 152	2, 003	661, 736	42, 537		
Hard, private	23, 688	1, 890				
Conchs			20, 000	200		
Oysters:						
Market, public, spring	81, 185	6, 741	708, 983	44, 727		
Market, public, fall	86, 143	7, 252	792, 099	73, 852		
Market, private, spring	35, 545	3, 063				
Market, private, fall	79, 298	6, 563				
Scallops, bay			21, 867	2, 139		
Terrapin, diamond-back	406	83				
Turtles:						
Green			21, 550	1, 078		
Soft-shell	11, 578	235				

Fisheries of Florida, 1930—Continued

CATCH: BY DISTRICTS—Continued

Species	East Coast		West Coast		Lake Okeechobee	
	Pounds	Value	Pounds	Value	Pounds	Value
Sponges:						
Grass			82, 918	$26, 556		
Sheepswool			370, 465	858, 699		
Velvet			682	409		
Wire			3, 781	2, 041		
Yellow			91, 155	42, 955		
Total	64, 023, 344	$1, 527, 579	53, 524, 560	3, 001, 397	2, 867, 232	$116, 776

Industries related to the fisheries of Florida, 1930

TRANSPORTING

Item	Charlotte County	Collier County	Escambia County	Lee County	Levy County	Nassau County	Monroe County	Pinellas County	Total
Persons engaged:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	17	2	2	8	2		13	7	51
On boats						1		46	47
Total	17	2	2	8	2	1	13	53	98
Vessels:									
Motor—									
5 to 10 tons	2				2		1	2	7
11 to 20 tons	3	1	1	3			4		12
21 to 30 tons				1			1	1	3
31 to 40 tons	1						1		2
Total	6	1	1	4	2		7	3	24
Net tonnage	107	16	12	69	16		124	35	379
Sail—									
5 to 10 tons								1	1
11 to 20 tons							1	1	2
Total							1	2	3
Net tonnage							16	25	41
Total vessels	6	1	1	4	2		8	5	27
Total net tonnage	107	16	12	69	16		140	60	420
Boats						3		38	41

WHOLESALE AND MANUFACTURING

Operating Units, Salaries, and Wages

Item	Bay County	Brevard and Indian River Counties	Charlotte, Lee, and Collier Counties	Citrus and Pasco Counties	Clay County	Dade County	Duval County	Escambia and Okaloosa Counties
Establishments	10	13	8	8	3	9	13	4
Persons engaged:								
Proprietors	10	14	12	10	4	11	17	5
Salaried employees	3	3	9			5	18	9
Wage earners—								
Average for season	19	27	59	28	6	18	158	37
Average for year	17	13	54	16	6	18	88	37
Paid to salaried employees	$5, 700	$2, 720	$31, 952			$12, 520	$83, 146	$40, 992
Paid to wage earners	13, 092	9, 610	45, 856	$7, 740	$3, 280	24, 240	79, 404	31, 597
Total salaries and wages	18, 792	12, 330	77, 808	7, 740	3, 280	36, 760	162, 550	72, 589

Industries related to the fisheries of Florida, 1930—Continued

WHOLESALE AND MANUFACTURING—Continued

OPERATING UNITS, SALARIES, AND WAGES—Continued

Item	Franklin County	Gulf County	Glades, Okeechobee, and Hendry Counties	Hillsborough County	Levy and Dixie Counties	Taylor and Wakulla Counties	Manatee County	Monroe County
Establishments	21	4	6	6	7	4	7	12
Persons engaged:								
Proprietors	24	4	6	8	9	6	11	11
Salaried employees	13	3	3	3	2	--------	--------	6
Wage earners—								
Average for season	465	42	14	7	16	7	9	52
Average for year	150	23	12	7	16	7	8	37
Paid to salaried employees	$24, 320	$9, 000	$3, 560	$5, 844	$2, 400	--------	$6, 160	$15, 240
Paid to wage earners	69, 093	17, 415	7, 240	4, 910	8, 834	$4, 510	5, 890	34, 858
Total salaries and wages	93, 413	26, 415	10, 800	10, 754	11, 234	4, 510	12, 050	50, 098

Item	Nassau County	Palm Beach County	Pinellas County	Putnam and St. Johns Counties	Sarasota County	St. Lucie County	Volusia and Seminole Counties	Total
Establishments	7	12	25	16	3	11	14	223
Persons engaged:								
Proprietors	11	20	39	15	3	13	16	279
Salaried employees	6	4	5	7	2	3	--------	104
Wage earners—								
Average for season	411	15	77	282	10	42	11	1, 812
Average for year	177	15	53	63	10	22	8	857
Paid to salaried employees	$30, 086	$4, 100	$31, 572	$10, 568	$2, 900	$5, 100	--------	$327, 880
Paid to wage earners	95, 375	12, 380	35, 651	28, 099	7, 646	15, 250	$4, 748	566, 718
Total salaries and wages	125, 461	16, 480	67, 223	38, 667	10, 546	20, 350	4, 748	894, 598

PRODUCTS MANUFACTURED

Item		Quantity	Value
Menhaden products:			
Acid scrap	tons	2, 782	$71, 250
Dry scrap	do	4, 736	230, 241
Meal	do	7, 142	368, 637
Oil	gallons	481, 948	94, 064
Mullet:			
Dry-salted	pounds	370, 067	19, 199
Roe, salted	do	29, 684	7, 920
Spanish mackerel, dry-salted	do	70, 100	5, 155
Shrimp, canned	standard cases	69, 372	491, 231
Oysters, fresh-shucked	gallons	134, 731	203, 327
Unclassified products:			
Fresh and frozen fillets [1]	pounds	79, 499	16, 626
Fresh and frozen steaks and sticks [2]	do	163, 428	22, 049
Other fresh packaged and salted [3]		(4)	4, 670
Canned [5]		(4)	228, 322
By-products [6]		(4)	233, 060
Total		------------	1, 995, 751

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[1] Includes fresh fillets of snook, groupers, and red snapper; frozen fillets of amberjack, bluefish, flounders, groupers, mullet, Spanish mackerel, and red snapper.

[2] Includes fresh and frozen amberjack, grouper, and red snapper steaks; and frozen red snapper fish sticks.

[3] Includes fresh-cooked crab meat; fresh-shucked hard clams, conchs and bay scallops; and salted bluefish.

[4] Data not available.

[5] Includes canned hard clam products, oysters, and green turtle meat and soup.

[6] Includes oyster-shell products; shark hides, fins, teeth, and oil; fish scrap; shrimp meal; and novelties made from shells and fish scales.

Industries related to the fisheries of Florida, 1930—Continued

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 240]

Item	Quantity	Value
Mullet:		
Dry-salted........pounds	471,600	$23,496
Roe, dry-salted........do	43,200	10,800
Sturgeon roe, fresh........do	10	5
Crab meat, packaged (fresh-cooked)........do	600	210
Oysters, fresh-shucked........gallons	6,143	8,548
Scallops, bay, fresh-shucked........do	2,247	3,218
Total		46,277

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State, Of the total number of persons employed on transporting craft, 47 have also been included as fishermen. and among the total persons engaged in the preparation of fishermen's manufactured products, 228 have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

Sponge fishery of Florida, 1930

OPERATING UNITS: BY GEAR

Item	Sponge hooks	Diving outfits	Total
	Number	*Number*	*Number*
Fishermen on boats and shore, regular	334	412	746
Boats:			
Motor		55	55
Other	283		283
Apparatus	283	55	

CATCH: BY GEAR

Sponges	Sponge hooks		Diving outfits		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Grass	76,718	$24,572	6,200	$1,984	82,918	$26,556
Sheepswool	98,513	182,458	271,952	676,241	370,465	858,699
Velvet	682	409			682	409
Wire	490	110	3,291	1,931	3,781	2,041
Yellow	39,015	12,709	52,140	30,246	91,155	42,955
Total	215,418	220,258	333,583	710,402	549,001	930,660

SPONGES SOLD AT THE EXCHANGE, TARPON SPRINGS, FLA.

During 1931 sponges handled on the exchange at Tarpon Springs, Fla., amounted to 372,771 pounds, valued at $609,773. This is a decrease of 10 per cent in quantity and 24 per cent in value as compared with the quantity and value of the transactions on the exchange during 1930. A large part of this decrease may be attributed to the fact that there was an unusually large hold over on January 1, 1932.

It is estimated that the value of sponges sold outside the exchange during 1931 amounted to $40,000. Of the total sponges sold on the exchange in 1931, 168,820 pounds, valued at $522,156, were large wool; 30,837 pounds, valued at $24,670, were small wool; 97,742 pounds, valued at $39,096, were yellow; 62,982 pounds, valued at $18,895, were grass; and 12,390 pounds, valued at $4,956, were wire sponges.

ALABAMA

Fisheries of Alabama, 1930

OPERATING UNITS: BY GEAR

Item	Haul seines	Trammel nets	Lines			
			Hand	Troll	Trot, with baits or snoods	Trot, with hooks
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	6	16	96			
On boats and shore—						
Regular	39	84	32	4	5	34
Casual		4	21		9	
Total	45	104	149	4	14	34
Vessels, motor:						
5 to 10 tons	1	4	3			
11 to 20 tons			7			
61 to 70 tons			1			
Total	1	4	11			
Net tonnage	9	32	186			
Boats:						
Motor	11	32	6	2		4
Other	3	77	14		14	34
Accessory boats	1	12				
Apparatus:						
Number	8	84	149	2	14	177
Length, yards	5,900					
Square yards		28,692				
Hooks, baits, or snoods			271	2	2,475	17,900

Item	Fyke nets	Otter trawls, shrimp	Spears	Tongs	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		30				142
On boats and shore—						
Regular	29	246	4	112	14	469
Casual			17	4	18	55
Total	29	276	21	116	32	666
Vessels, motor:						
5 to 10 tons		14				21
11 to 20 tons		1				8
61 to 70 tons						1
Total		15				30
Net tonnage		117				335
Boats:						
Motor	4	123		47		185
Other	29			41		183
Accessory boats						13
Apparatus:						
Number	119	138	21	116		
Yards at mouth		1,800				

Fisheries of Alabama, 1930—Continued

CATCH: BY GEAR

Species	Haul seines		Trammel nets		Lines			
					Hand		Troll	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	12, 749	$558	7, 905	$368				
Bluerunner or hardtail	2, 205	63						
Cabio							2, 200	$100
Catfish and bullheads	1, 105	51	9, 644	474	1, 375	$100		
Crevalle	2, 558	70						
Croaker	2, 403	78	4, 940	165	104	4		
Drum:								
Black	6, 796	335	4, 787	229	110	5		
Red or redfish	44, 733	3, 012	55, 520	2, 884	4, 081	211		
Flounders			11, 233	783				
Groupers					177, 945	5, 338		
Jewfish					5, 021	151		
King whiting or "kingfish"	2, 520	95	2, 838	88	440	16		
Mullet	757, 220	29, 332	1, 448, 158	56, 675				
Pompano	171	33	4, 891	757				
Sheepshead, salt-water	8, 552	499	7, 741	420	1, 276	69		
Snapper, red					847, 918	67, 833		
Spadefish			110	3				
Spanish mackerel	484	48	5, 324	290				
Spot	635	21	926	45				
Squeteagues or "sea trout":								
Gray	207	10	5, 940	216	440	20		
Spotted	13, 769	1, 157	86, 374	6, 578	5, 838	533		
Sturgeon	1, 816	297						
Tenpounder	5, 369	215						
Tripletail			55	2	220	11		
Total	863, 292	35, 874	1, 656, 386	69, 977	1, 044, 768	74, 291	2, 200	100

Species	Lines—Continued				Fyke nets		Otter trawls, shrimp	
	Trot, with baits or snoods		Trot, with hooks					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Buffalofish			61, 176	$3, 339	39, 679	$2, 164		
Catfish and bullheads			48, 428	3, 265	30, 352	2, 111		
Paddlefish			2, 251	125				
Crabs, hard	79, 968	$1, 142						
Shrimp							2, 982, 200	$97, 219
Total	79, 968	1, 142	111, 855	6, 729	70, 031	4, 275	2, 982, 200	97, 219

Species	Spears		Tongs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders	12, 947	$1, 177				
Crabs, soft					780	$195
Oysters:						
Market, public, spring			40, 144	$3, 755		
Market, public, fall			225, 506	17, 723		
Market, private, spring			4, 080	480		
Market, private, fall			17, 064	1, 896		
Terrapin, diamond-back					2, 018	635
Total	12, 947	1, 177	286, 794	23, 854	2, 798	830

OPERATING UNITS: BY COUNTIES

Item	Baldwin	Mobile
	Number	*Number*
Fishermen:		
On vessels	6	136
On boats and shore—		
Regular	68	401
Casual	14	41
Total	88	578

Fisheries of Alabama, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Baldwin	Mobile
	Number	*Number*
Vessels, motor:		
5 to 10 tons	2	19
11 to 20 tons	--------	8
61 to 70 tons	--------	1
Total	2	28
Net tonnage	16	319
Boats:		
Motor	26	159
Other	43	140
Accessory boats	2	11
Apparatus:		
Haul seines	1	7
Length, yards	500	5, 400
Trammel nets	36	48
Square yards	13, 285	15, 407
Lines—		
Hand	9	140
Hooks	9	262
Troll	2	--------
Hooks	2	--------
Trot, with baits or snoods	--------	14
Baits or snoods	--------	2, 475
Trot, with hooks	2	175
Hooks	400	17, 500
Fyke nets	--------	119
Otter trawls, shrimp	7	131
Yards at mouth	90	1, 710
Spears	7	14
Tongs	19	97

CATCH: BY COUNTIES

Species	Baldwin		Mobile	
	Pounds	Value	Pounds	Value
Bluefish	9, 398	$365	11, 256	$561
Blue runner or hardtail	825	22	1, 380	41
Buffalofish	--------	--------	100, 855	5, 503
Cabio	2, 200	100	--------	--------
Catfish and bullheads	9, 193	481	81, 711	5, 520
Crevalle	330	9	2, 228	61
Croaker	2, 877	96	4, 570	151
Drum:				
Black	1, 318	60	10, 375	509
Red or redfish	30, 674	1, 518	73, 660	4, 589
Flounders	5, 390	385	18, 790	1, 575
Groupers	--------	--------	177, 945	5, 338
Jewfish	--------	--------	5, 021	151
King whiting or "kingfish"	1, 650	45	4, 148	154
Mullet	716, 461	28, 425	1, 488, 917	57, 582
Paddlefish	--------	--------	2, 251	125
Pompano	4, 061	662	1, 001	128
Sheepshead, salt water	3, 740	204	13, 829	784
Snapper, red	--------	--------	847, 918	67, 833
Spadefish	--------	--------	110	3
Spanish mackerel	4, 444	242	1, 364	96
Spot	1, 012	47	549	19
Squeteagues or "sea trout":				
Gray	--------	--------	6, 587	246
Spotted	32, 009	2, 405	73, 972	5, 863
Sturgeon	1, 816	297	--------	--------
Tenpounder	--------	--------	5, 369	215
Tripletail	55	2	220	11
Crabs:				
Hard	--------	--------	79, 968	1, 142
Soft	--------	--------	780	195
Shrimp	168, 400	5, 490	2, 813, 800	91, 729
Oysters:				
Market, public, spring	3, 570	315	36, 574	3, 440
Market, public, fall	10, 761	949	214, 745	16, 774
Market, private, spring	--------	--------	4, 080	480
Market, private, fall	17, 064	1, 896	--------	--------
Terrapin, diamond-back	1, 142	416	876	219
Total	1, 028, 390	44, 431	6, 084, 849	271, 037

Industries related to the fisheries of Alabama, 1930

TRANSPORTING

Item	Baldwin County	Mobile County	Total
Persons engaged:	*Number*	*Number*	*Number*
On vessels	6	6	12
On boats		18	18
Total	6	24	30
Vessels, motor:			
5 to 10 tons	2	3	5
11 to 20 tons	1		1
Total	3	3	6
Net tonnage	33	22	55
Boats		3	3

WHOLESALE AND MANUFACTURING IN BALDWIN AND MOBILE COUNTIES

OPERATING UNITS, SALARIES, AND WAGES

Establishments	21
Persons engaged:	
Proprietors	31
Salaried employees	16
Wage earners—	
Average for season	492
Average for year	218
Paid to salaried employees	$52, 105
Paid to wage earners	86, 135
Total salaries and wages	138, 240

PRODUCTS MANUFACTURED

Item		Quantity	Value
Mullet, dry-salted	pounds	45, 000	$2, 450
Shrimp, canned	standard cases	43, 942	246, 768
Oysters, fresh-shucked	gallons	15, 209	18, 295
Miscellaneous [1]		(2)	62, 477
Total			329, 990

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 46]

Sturgeon roe, fresh	pounds	32	$19
Oysters, fresh-shucked	gallons	7, 259	7, 680
Total			7, 699

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[1] Includes frozen red snapper fillets; salted mullet roe; cooked shrimp; canned oysters; dry shrimp hulls; and oyster-shell products.

[2] Data not available.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons employed on transporting craft, 18 have also been included as fishermen, and among the total persons engaged in the preparation of fishermen's manufactured products, 42 have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

MISSISSIPPI

Fisheries of Mississippi, 1930

OPERATING UNITS: BY GEAR

Item	Haul seines	Trammel nets	Lines		Dip nets, drop	Cast nets
			Hand	Trot, with baits or snoods		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			16			
On boats and shore—						
Regular	272	96	37	54	2	
Casual		6	114	12	32	54
Total	272	102	167	66	34	54
Vessels:						
Motor—						
5 to 10 tons			1			
11 to 20 tons			1			
Total			2			
Net tonnage			25			
Boats:						
Motor	45	34	15	9	1	
Other	30	51	104	60	14	
Apparatus:						
Number	45	55	167	66	232	54
Length, yards	9, 220					
Square yards		17, 785				
Hooks, baits, or snoods			201	20, 795		

Item	Otter trawls, shrimp	Spears	Dredges, oyster	Tongs	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	225		530			555
On boats and shore—						
Regular	598	8	380	440		1, 355
Casual	9	68			31	193
Total	832	76	910	440	31	2, 103
Vessels:						
Motor—						
5 to 10 tons	35		41			44
11 to 20 tons	26		67			69
21 to 30 tons	3		10			11
31 to 40 tons			1			1
Total	64		119			125
Net tonnage	711		1, 600			1, 678
Sail—						
5 to 10 tons			1			1
11 to 20 tons			4			4
Total			5			5
Net tonnage			66			66
Total vessels	64		124			130
Total net tonnage	711		1, 666			1, 744
Boats:						
Motor	408		95	30		401
Other				406		615
Apparatus:						
Number	363	76	437	440		
Yards at mouth	4, 607		443			

Fisheries of Mississippi, 1930—Continued

CATCH: BY GEAR

Species	Haul seines		Trammel nets		Lines			
					Hand		Trot, with baits or snoods	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish			19,191	$1,047				
Buffalofish					14,969	$680		
Cabio or crab eater			1,100	60	737	38		
Catfish and bullheads			38,146	1,734	23,276	1,058		
Crevalle			9,847	269	110	3		
Croaker			6,105	221	5,170	176		
Drum:								
Black			19,270	901	1,485	71		
Red or redfish			112,972	6,227	9,058	494		
Flounders			31,886	2,542				
Groupers					71,093	2,133		
Jewfish					1,274	38		
King whiting or "kingfish"			5,604	183				
Mullet			790,735	31,629				
Pompano			791	228				
Sheepshead, salt-water			28,509	1,625	1,568	86		
Snapper, red					188,725	15,875		
Spanish mackerel			1,027	71	328	17		
Squeteagues or "sea trout":								
Gray			58,591	1,953	48,576	1,767		
Spotted			79,612	7,381	45,500	4,963		
Sturgeon			73	22				
Tenpounder			4,725	142				
Tripletail			1,540	124	997	55		
Crabs, hard							574,679	$9,720
Shrimp	104,400	$3,915						
Total	104,400	3,915	1,209,724	56,359	412,866	27,454	574,679	9,720

Species	Dip nets, drop		Cast nets		Otter trawls, shrimp		Spears	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounder					8,855	$805	28,248	$2,654
Mullet			11,020	$491				
Sheepshead, salt-water			440	24				
Crabs, hard	98,602	$1,409						
Shrimp			6,570	792	8,378,080	314,164		
Total	98,602	1,409	18,030	1,307	8,386,935	314,969	28,248	2,654

Species	Dredges, oyster		Tongs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, soft					5,800	$1,740
Oysters:						
Market, public, spring, Mississippi	1,913,904	$125,508	280,182	$18,718		
Market, public, fall, Mississippi	68,820	4,313	171,794	12,380		
Market, public, spring, Louisiana	1,695,860	111,209	69,244	4,626		
Market, public, fall, Louisiana	673,832	42,224	22,610	1,629		
Total	4,352,416	283,254	543,830	37,353	5,800	1,740

OPERATING UNITS: BY COUNTIES

Item	Hancock	Harrison	Jackson
	Number	*Number*	*Number*
Fishermen:			
On vessels		524	31
On boats and shore—			
Regular	41	1,126	188
Casual	38	107	48
Total	79	1,757	267

Fisheries of Mississippi, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Hancock	Harrison	Jackson
Vessels:			
Motor—	*Number*	*Number*	*Number*
5 to 10 tons	---------	43	1
11 to 20 tons	---------	66	3
21 to 30 tons	---------	9	2
31 to 40 tons	---------	1	---------
Total	---------	119	6
Net tonnage	---------	1,573	105
Sail—			
5 to 10 tons	---------	1	---------
11 to 20 tons	---------	4	---------
Total	---------	5	---------
Net tonnage	---------	66	---------
Total vessels	---------	124	6
Total net tonnage	---------	1,639	105
Boats:			
Motor	17	322	62
Other	47	467	101
Apparatus:			
Haul seines	---------	44	1
Length, yards	---------	9,020	200
Trammel nets	9	22	24
Square yards	3,006	8,354	6,425
Lines—			
Hand	26	67	74
Hooks	26	67	108
Trot, with baits or snoods	---------	56	10
Baits or snoods	---------	19,345	1,450
Dip nets, drop	232	---------	---------
Cast nets	---------	50	4
Otter trawls, shrimp	---------	321	42
Yards at mouth	---------	4,084	523
Spears	9	51	16
Dredges, oyster	---------	429	8
Yards at mouth	---------	435	8
Tongs	17	370	53

CATCH: BY COUNTIES

Species	Hancock		Harrison		Jackson	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	---------	---------	---------	---------	19,191	$1,047
Buffalofish	---------	---------	---------	---------	14,969	680
Cabio or crab eater	---------	---------	1,837	$98	---------	---------
Catfish and bullheads	7,920	$360	37,818	1,719	15,684	713
Crevalle	---------	---------	330	9	9,627	263
Croaker	550	20	5,115	181	5,610	196
Drum:						
Black	4,620	168	9,119	436	7,016	368
Red or redfish	16,830	918	43,510	2,373	61,690	3,430
Flounders	13,575	1,124	38,665	3,413	16,749	1,464
Groupers	---------	---------	---------	---------	71,093	2,133
Jewfish	---------	---------	---------	---------	1,274	38
King whiting or "kingfish"	550	15	3,685	122	1,369	46
Mullet	48,500	1,940	86,789	3,521	666,466	26,659
Pompano	---------	---------	165	45	626	183
Sheepshead, salt-water	4,950	270	5,198	284	20,369	1,181
Snapper, red	---------	---------	---------	---------	188,725	15,875
Spanish mackerel	480	28	248	13	627	47
Squeteagues or "sea trout":						
Gray	26,850	798	37,356	1,360	42,961	1,562
Spotted	35,310	3,423	43,917	4,394	45,885	4,527
Sturgeon	---------	---------	---------	---------	73	22
Tenpounder	---------	---------	---------	---------	4,725	142
Tripletail	440	24	1,155	76	942	79
Crabs:						
Hard	98,602	1,409	501,249	8,646	73,430	1,074
Soft	1,320	396	4,480	1,344	---------	---------
Shrimp	---------	---------	7,888,830	296,231	600,220	22,640
Oysters:						
Market, public, spring, Mississippi	31,990	2,856	1,981,886	129,110	135,982	9,893
Market, public, fall, Mississippi	57,120	4,896	134,858	8,474	48,636	3,414
Market, public, spring, Louisiana	---------	---------	1,765,776	115,033	43,556	3,169
Market, public, fall, Louisiana	---------	---------	696,442	43,762	---------	---------
Total	349,607	18,645	13,288,428	620,644	2,097,495	100,845

Industries related to the fisheries of Mississippi, 1930

TRANSPORTING IN HARRISON COUNTY

Persons engaged on boats	26
Boats	13

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Hancock and Harrison Counties	Jackson County	Total
Establishments	45	8	53
Persons engaged:			
Proprietors	60	12	72
Salaried employees	29	8	37
Wage earners—			
Average for season	2, 375	171	2, 546
Average for year	1, 004	52	1, 056
Paid to salaried employees	$95, 176	$11, 085	$106, 261
Paid to wage earners	350, 934	18, 497	369, 431
Total salaries and wages	446, 110	29, 582	475, 692

PRODUCTS MANUFACTURED

Item	Quantity	Value
Crab meat, packaged (fresh-cooked) pounds	57, 150	$16, 810
Shrimp:		
Packaged, cooked, and peeled do	193, 145	59, 594
Canned—		
Wet in tins and glass standard cases	61, 273	336, 035
Dry in tins do	45, 904	268, 290
Oysters:		
Fresh-shucked gallons	83, 404	125, 136
Canned standard cases	224, 921	1, 034, 362
Shell products—		
Poultry feed tons	38, 663	270, 641
Lime do	7, 733	5, 126
Miscellaneous [1]	(2)	25, 125
Total		2, 141, 119

FISHERMEN'S PREPARED PRODUCTS

[Number of persons engaged, 61]

Oysters, fresh-shucked gallons	7, 446	$9, 658

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[1] Includes salted mullet, canned shrimp gumbo soup, and shrimp meal.

[2] Data not available.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore they can not be correlated directly with the catch within the State. Of the total number of persons employed on transporting craft, 26 have also been included as fishermen, and among the total persons engaged in the preparation of fishermen's manufactured products, 57 have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

LOUISIANA

Fisheries of Louisiana, 1930

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets, run-around	Trammel nets	Lines		
				Hand	Trot, with baits or snoods	Trot, with hooks
Fishermen:						
On boats and shore—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	608	2	98	61	201	3
Casual	47		2	86	87	
Total	655	2	100	147	288	3
Boats:						
Motor	129	1	45	28	25	3
Other	177	1	51	100	259	
Apparatus:						
Number	138	1	50	147	288	3
Length, yards	27,875					
Square yards		30	13,712			
Hooks, baits, or snoods				152	58,370	300

Item	Dip nets, drop	Cast nets	Otter trawls, shrimp	Dredges, clam	Tongs	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			249	147			370
On boats and shore—							
Regular	8	3	1,650	14	524	125	2,775
Casual	15				2	94	238
Total	23	3	1,899	161	526	219	3,383
Vessels, motor:							
5 to 10 tons			107	30			133
11 to 20 tons			8	10			15
Total vessels			115	40			148
Total net tonnage			780	370			1,074
Boats:							
Motor	11		825	4	3		997
Other	21				523		1,073
Apparatus:							
Number	1,700	3	940	72	526		
Yards at mouth			12,213	72			

CATCH: BY GEAR

Species	Haul seines		Gill nets, runaround		Trammel nets		Lines—Hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	24,400	$856			35,443	$1,199	27,700	$1,030
Crevalle					165	15		
Croaker	29,860	1,972			25,903	1,905	4,100	328
Drum:								
Black	31,013	1,255			91,423	3,463	44,000	1,733
Red or redfish	65,322	5,017			176,640	13,776	92,920	7,166
Flounders	5,030	481			18,037	1,602		
Garfish					1,320	120		
Groupers							3,500	105
Jewfish							6,000	180
King whiting or "kingfish"	21,450	675			32,917	1,029		
Mullet	7,809	269			110	10		
Pompano					1,112	301		
Sharks							300,000	1,400
Sheepshead, salt-water	19,430	1,150			65,994	3,818	16,700	1,025
Snapper, red							76,400	6,112
Spanish mackerel							1,800	108
Spot	6,000	179			3,704	111		
Squeteagues or "sea trout":								
Gray	68,150	2,106			164,379	4,943	90,800	2,760
Spotted	73,093	8,529	151	$14	204,357	23,536	109,500	13,785
Tripletail					5,301	455		
Shrimp	677,810	21,624						
Turtles, loggerhead	50,050	1,052						
Total	1,079,417	45,615	151	14	826,805	56,283	773,420	35,732

Fisheries of Louisiana, 1930—Continued

CATCH: BY GEAR—Continued

Species	Lines—Continued				Dip nets, drop		Cast nets	
	Trot, with baits or snoods		Trot, with hooks					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	-----	-----	1,600	$128	-----	-----	-----	-----
Mullet	-----	-----	-----	-----	-----	-----	1,053	$32
Crabs, hard	4,044,995	$60,637	-----	-----	141,000	$2,820	-----	-----
Total	4,044,995	60,637	1,600	128	141,000	2,820	1,053	32

Species	Otter trawls, shrimp		Dredges, oyster		Tongs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, soft	-----	-----	-----	-----	-----	-----	145,732	$58,068
Shrimp	37,986,677	$1,138,002	-----	-----	-----	-----	-----	-----
Oysters:								
Market, public, spring	-----	-----	266,664	$11,111	4,800	$640	-----	-----
Market, public, fall	-----	-----	342,708	18,932	63,960	6,008	-----	-----
Market, private, spring	-----	-----	184,800	9,748	1,613,032	191,909	-----	-----
Market, private, fall	-----	-----	639,884	80,026	1,730,452	231,672	-----	-----
Terrapin, diamond-back	-----	-----	-----	-----	-----	-----	38,750	12,980
Total	37,986,677	1,138,002	1,434,056	119,817	3,412,244	430,229	184,482	71,048

OPERATING UNITS: BY PARISHES

Item	Cameron	Iberia	Jefferson Davis	Jefferson	La Fourche	Orleans
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	-----	-----	-----	20	95	57
On boats and shore—						
Regular	9	14	4	721	568	158
Casual	-----	10	-----	40	2	19
Total	9	24	4	781	665	234
Vessels, motor:						
5 to 10 tons	-----	-----	-----	8	44	15
11 to 20 tons	-----	-----	-----	1	1	2
Total vessels	-----	-----	-----	9	45	17
Total net tonnage	-----	-----	-----	63	296	142
Boats:						
Motor	4	2	2	261	232	68
Other	4	19	-----	166	168	61
Apparatus:						
Haul seines	-----	1	1	37	10	22
Length, yards	-----	100	75	13,225	1,680	2,660
Gill nets, runaround	1	-----	-----	-----	-----	-----
Square yards	30	-----	-----	-----	-----	-----
Trammel nets	-----	1	-----	10	4	7
Square yards	-----	96	-----	2,822	1,160	1,480
Lines—						
Hand	-----	-----	-----	17	-----	14
Hooks	-----	-----	-----	17	-----	19
Trot, with baits or snoods	2	6	-----	40	7	-----
Baits or snoods	280	520	-----	8,500	1,450	-----
Trot, with hooks	3	-----	-----	-----	-----	-----
Hooks	300	-----	-----	-----	-----	-----
Dip nets, drop	-----	-----	-----	-----	-----	1,220
Cast nets	3	-----	-----	-----	-----	-----
Otter trawls, shrimp	1	-----	2	222	272	39
Yards at mouth	11	-----	27	2,830	3,564	543
Dredges, oyster	-----	-----	-----	2	1	23
Yards at mouth	-----	-----	-----	2	1	23
Tongs	5	14	-----	70	150	-----

Fisheries of Louisiana, 1930—Continued

OPERATING UNITS: BY PARISHES—Continued

Item	Plaquemines	St. Bernard	St. Charles	St. Mary	St. Tammany	Terrebonne	Vermilion
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	74	--------	--------	34	8	82	--------
On boats and shore—							
Regular	362	199	24	135	10	522	49
Casual	8	64	--------	19	3	47	26
Total	444	263	24	188	21	651	75
Vessel, motor:							
5 to 10 tons	22	--------	--------	9	1	34	--------
11 to 20 tons	4	--------	--------	3	1	3	--------
Total vessels	26	--------	--------	12	2	37	--------
Total net tonnage	189	--------	--------	114	22	248	--------
Boats:							
Motor	137	49	12	37	2	172	19
Other	93	188	--------	81	8	260	25
Apparatus:							
Haul seines	17	22	--------	4	--------	11	13
Length, yards	2,950	3,455	--------	540	--------	1,180	2,010
Trammel nets	8	14	--------	--------	--------	5	1
Square yards	2,525	4,791	--------	--------	--------	705	133
Lines—							
Hand	--------	54	--------	--------	--------	62	--------
Hooks	--------	54	--------	--------	--------	62	--------
Trot, with baits or snoods	7	135	--------	83	--------	2	6
Baits or snoods	1,350	29,920	--------	15,800	--------	250	300
Dip nets, drop	--------	--------	--------	--------	480	--------	--------
Otter trawls, shrimp	134	24	12	44	--------	188	2
Yards at mouth	1,704	308	157	583	--------	2,461	25
Dredges, oyster	22	--------	--------	10	4	6	4
Yards at mouth	22	--------	--------	10	4	6	4
Tongs	55	--------	--------	26	4	200	2

CATCH: BY PARISHES

Species	Cameron		Iberia		Jefferson Davis		Jefferson	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Catfish and bullheads	1,600	$128	--------	--------	--------	--------	2,000	$60
Croaker	--------	--------	55	$2	440	$12	1,520	45
Drum:								
Black	--------	--------	137	12	55	2	8,330	250
Red or redfish	--------	--------	550	50	660	48	37,000	2,960
Flounders	--------	--------	30	6	110	10	4,540	363
King whiting or "kingfish"	--------	--------	165	6	550	20	24,220	726
Mullet	1,053	32	--------	--------	--------	--------	3,060	92
Sharks	--------	--------	--------	--------	--------	--------	300,000	1,400
Sheepshead, salt-water	--------	--------	220	30	--------	--------	9,140	457
Spanish mackerel	--------	--------	--------	--------	--------	--------	600	36
Spot	--------	--------	--------	--------	--------	--------	1,500	44
Squeteagues or "sea trout":								
Gray	--------	--------	275	12	--------	--------	4,000	120
Spotted	151	14	220	40	715	78	57,803	5,780
Crabs:								
Hard	2,880	48	24,500	350	--------	--------	975,000	16,250
Soft	--------	--------	--------	--------	--------	--------	33,720	12,645
Shrimp	3,400	340	1,500	150	6,500	650	9,715,852	291,476
Oysters:								
Market, private, spring	19,600	1,470	49,512	8,254	--------	--------	310,800	38,850
Market, private, fall	24,400	1,830	86,004	14,334	--------	--------	413,496	51,687
Terrapin, diamond-back	--------	--------	--------	--------	--------	--------	38,750	12,980
Turtles, loggerhead	--------	--------	--------	--------	--------	--------	50,050	1,502
Total	53,084	3,862	163,168	23,246	9,030	820	11,991,381	437,723

Fisheries of Louisiana, 1930—Continued

CATCH: BY PARISHES—Continued

Species	LaFourche		Orleans		Plaquemines		St. Bernard	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Catfish and bullheads			14,400	$432	10,430	$312	10,300	$309
Croaker	220	$6	15,500	1,045	5,208	385	26,944	2,152
Drum:								
Black	13,200	360	9,860	394	24,400	976	84,020	3,360
Red or redfish	53,900	3,920	24,150	1,932	28,304	2,265	54,172	4,332
Flounders	4,400	320	780	78	2,544	254	3,804	382
Groupers			3,500	105				
Jewfish			6,000	180				
King whiting or "kingfish"			2,500	75	3,200	96	16,404	491
Mullet							1,200	48
Pompano			420	126			252	75
Sheepshead, salt-water	22,052	1,003	10,050	603	12,656	759	28,028	1,691
Snapper, red			76,400	6,112				
Spanish mackerel							1,200	72
Spot			900	27	2,600	78	4,704	141
Squeteagues or "sea trout":								
Gray	3,300	90	4,200	126	32,600	978	265,000	7,948
Spotted	20,511	1,908	7,882	1,019	36,704	4,405	186,392	23,984
Tripletail	2,255	205			2,496	150		
Crabs:								
Hard	391,200	6,520	46,800	936	150,000	2,500	853,680	14,228
Soft			8,520	4,260	4,960	1,860	94,132	37,653
Shrimp	11,082,026	332,060	1,414,332	42,430	5,505,043	165,150	1,132,000	33,960
Oysters:								
Market, public, spring			266,664	11,111				
Market, public, fall			165,888	8,294				
Market, private, spring	214,200	22,200	4,980	622	256,080	41,360		
Market, private, fall	297,280	28,260	361,440	45,180	489,848	71,749		
Total	12,104,544	396,852	2,445,166	125,087	6,567,073	293,277	2,762,232	130,826

Species	St. Charles		St. Mary		St. Tammany		Terrebonne		Vermilion	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Catfish and bullheads							48,213	$1,822	2,200	$150
Crevalle									165	15
Croaker			1,210	$44			6,016	224	2,750	290
Drum:										
Black			1,320	96			24,344	933	770	68
Red or redfish							131,306	9,860	4,840	592
Flounders			50	8			6,479	612	330	50
Garfish									1,320	120
King whiting or "kingfish"							6,338	230	990	60
Mullet							3,549	129	110	10
Pompano							440	100		
Sheepshead, salt-water			880	80			15,248	970	3,850	400
Squeteagues or "sea trout":										
Gray			2,640	120			11,314	415		
Spotted			1,320	240			70,563	7,708	4,840	688
Tripletail									550	100
Crabs:										
Hard			1,570,730	19,469	94,200	$1,884	5,005	72	72,000	1,200
Soft					4,400	1,650				
Shrimp	16,000	$12,480	1,711,910	49,560			7,591,924	227,758	84,000	3,612
Oysters:										
Market, public, spring					4,800	640				
Market, public, fall			98,800	7,156	96,504	5,956			45,476	3,534
Market, private, spring			85,704	13,214			855,156	75,462	1,800	225
Market, private, fall			111,072	17,337			582,576	80,751	4,220	570
Total	16,000	12,480	3,585,636	107,324	199,904	10,130	9,358,471	407,046	230,211	11,684

Industries related to the fisheries of Louisiana, 1930

TRANSPORTING

Item	Iberia Parish	Jefferson Parish	La Fourche Parish	Orleans Parish	Plaquemines Parish	St. Mary Parish	St. Tammany Parish	Terrebonne Parish	Vermilion Parish	Total
Persons engaged:	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
On vessels	-------	14	44	13	4	16	-------	42	-------	133
On boats	14	34	34	-------	2	14	4	138	6	246
Total	14	48	78	13	6	30	4	180	6	379
Vessels, motor:										
5 to 10 tons	-------	6	17	2	2	4	-------	21	-------	52
11 to 20 tons	-------	1	4	4	-------	4	-------	-------	-------	13
Total	-------	7	21	6	2	8	-------	21	-------	65
Net tonnage	-------	58	169	73	13	76	-------	136	-------	525
Boats	7	17	17	-------	1	7	2	74	3	128

WHOLESALE AND MANUFACTURING

Operating Units, Salaries, and Wages

Item	Calcasieu, Jefferson Davis, and Vermilion Parishes	Iberia Parish	Jefferson Parish	Lafayette and St. Martin Parishes	La Fourche Parish	Orleans Parish
Establishments	5	3	16	3	7	10
Persons engaged:						
Proprietors	8	4	16	3	9	19
Salaried employees	1	----------	13	----------	5	32
Wage earners—						
Average for season	100	4	669	8	731	148
Average for year	18	4	310	6	254	84
Paid to salaried employees	$100	----------	$32, 617	----------	$13, 672	$132, 611
Paid to wage earners	6, 257	$2, 251	93, 699	$3, 498	82, 676	49, 030
Total salaries and wages	6, 357	2, 251	126, 316	3, 498	96, 348	181, 641

Item	Plaquemines and St. Bernard Parishes	St. Charles Parish	St. Mary Parish	Terrebonne Parish	Total
Establishments	9	3	10	36	102
Persons engaged:					
Proprietors	2	6	11	55	133
Salaried employees	9	----------	16	24	100
Wage earners—					
Average for season	849	6	315	991	3, 821
Average for year	344	6	249	508	1, 783
Paid to salaried employees	$13, 100	----------	$41, 250	$59, 320	$292, 670
Paid to wage earners	97, 452	$1, 814	141, 453	168, 068	646, 198
Total salaries and wages	110, 552	1, 814	182, 703	227, 388	938, 868

Industries related to the fisheries of Louisiana, 1930—Continued

WHOLESALE AND MANUFACTURING—Continued

PRODUCTS MANUFACTURED

Item	Quantity	Value
Squeteague, sun-dried ... pounds	27, 717	$8, 316
Crab meat, packaged (fresh-cooked) ... do	190, 220	46, 780
Shrimp:		
Sun-dried ... do	1, 588, 487	339, 577
Canned—		
Wet in tins ... standard cases	238, 467	1, 346, 205
Wet in glass ... do	2, 462	26, 865
Dry in tins ... do	167, 939	1, 080, 890
Meal ... tons	1, 445	39, 357
Oysters:		
Fresh-shucked ... gallons	242, 712	413, 350
Canned ... standard cases	43, 819	214, 819
Shell products—		
Poultry feed ... tons	116, 880	1, 012, 767
Lime ... do	9, 347	28, 997
Miscellaneous [1]	(2)	60, 410
Total		4, 618, 333

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[1] Includes shark skins, fins, meat, and oil; canned crabs; and fresh-packaged shrimp.

[2] Data not available.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons employed on transporting craft, 242 have also been included as fishermen. This fact should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

TEXAS

Fisheries of Texas, 1930

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets			Trammel nets	Lines	
		Anchor	Stake	Run-around		Hand	Troll
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:							
On vessels					6	110	
On boats and shore—							
Regular	76	4	277	108	140	193	4
Casual	78					156	
Total	154	4	277	108	146	459	4
Vessels, motor:							
5 to 10 tons						4	
11 to 20 tons					1	7	
21 to 30 tons						2	
31 to 40 tons						1	
41 to 50 tons						2	
Total					1	16	
Net tonnage					11	298	
Boats:							
Motor	6	2	47	28	54	82	3
Other	6		72	22	45	423	
Apparatus:							
Number	63	2	383	102	80	459	8
Length, yards	11, 250						
Square yards		2, 000	95, 294	23, 854	26, 651		
Hooks, baits, or snoods						678	8

Fisheries of Texas, 1930—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Lines—Contd.		Otter trawls, shrimp	Spears	Dredges, oyster	Tongs	By hand	Total, exclusive of duplication
	Trot, with baits or snoods	Trot, with hooks						
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels			84		18			178
On boats and shore—								
Regular	12	24	464	88	106	316	112	1,421
Casual	6			87		14	68	367
Total	18	24	548	175	124	330	180	1,966
Vessels, motor:								
5 to 10 tons			26		4			27
11 to 20 tons			6		1			12
21 to 30 tons								2
31 to 40 tons								1
41 to 50 tons								2
Total			32		5			44
Net tonnage			275		50			535
Boats:								
Motor	2	5	232	3	33	61		431
Other	14	17				219	122	498
Apparatus:								
Number	33	36	264	175	38	330		
Yards at mouth			3,855		37			
Hooks, baits, or snoods	4,300	5,500						

CATCH: BY GEAR

Species	Haul seines		Gill nets					
			Anchor		Stake		Runaround	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish							165	$14
Catfish and bullheads	29,700	$1,350	550	$30	12,024	$497	4,620	208
Crevalle							154	4
Croaker	12,980	434			1,540	42	7,680	272
Drum:								
Black	46,200	1,698	660	30	762,225	23,286	158,215	5,753
Red or redfish	77,154	6,010	2,860	260	324,856	28,127	57,117	4,184
Flounders	8,855	805			550	50	2,860	260
King whiting or "kingfish"	7,920	288					4,180	152
Mullet	3,630	132			3,741	75	550	25
Pompano	6,270	1,425					1,375	313
Sheepshead	7,370	327	220	16	7,051	300	3,300	160
Snook or sergeantfish	15,840	1,142			19,081	1,388	3,300	186
Spadefish	550	20						
Spanish mackerel	2,420	132					6,600	360
Squeteague or "sea trout," spotted	116,170	11,873	2,200	300	302,252	32,974	109,742	10,252
Total	335,059	25,636	6,490	636	1,433,320	86,739	359,858	22,143

Fisheries of Texas, 1930—Continued

CATCH: By gear—Continued

Species	Trammel nets		Lines							
			Hand		Troll		Trot, with baits or snoods		Trot, with hooks	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	11,924	$550	22,584	$1,027					16,170	$718
Croaker	9,713	347								
Drum:										
Black	63,496	2,127	21,172	762						
Red or redfish	169,672	14,963	210,358	16,678					30,580	2,224
Flounders	1,035	97	1,100	100						
Groupers			20,855	630						
Jewfish			1,430	56						
Kingfish or "king mackerel"					3,080	$120				
King whiting or "kingfish"	3,630	132								
Pompano	5,365	1,225								
Sheepshead	6,710	340	16,610	726					440	24
Snapper, red			929,578	75,385						
Snook or sergeantfish	1,225	100								
Spanish mackerel	1,799	142	63,470	3,542						
Squeteague or "sea trout," spotted	236,149	26,272	276,840	29,649						
Crabs, hard							29,046	$1,063		
Total	510,718	46,295	1,563,997	128,555	3,080	120	29,046	1,063	47,190	2,966

Species	Otter trawls, shrimp		Spears		Dredges, oyster		Tongs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders			56,987	$5,771						
Sheepshead			550	40						
Shrimp	10,189,318	$377,016								
Oysters:										
Market, public, spring					267,466	$15,029	209,854	$17,523	38,432	$3,336
Market, public, fall					219,463	14,657	330,052	23,510	84,304	5,229
Market, private, spring							3,040	475		
Market, private, fall							4,704	735		
Total	10,189,318	377,016	57,447	5,811	486,929	29,686	547,650	42,243	122,736	8,565

OPERATING UNITS: By counties

Item	Aransas	Brazoria	Calhoun	Cameron	Galveston	Harris
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels	2		26		114	
On boats and shore—						
Regular	118	8	212	206	289	6
Casual	16		58	20	117	
Total	136	8	296	226	520	6
Vessels, motor:						
5 to 10 tons	1		6		7	
11 to 20 tons			2		8	
21 to 30 tons					2	
31 to 40 tons					1	
41 to 50 tons					2	
Total	1		8		20	
Net tonnage	7		70		337	

Fisheries of Texas, 1930—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Aransas	Brazoria	Calhoun	Cameron	Galveston	Harris
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Boats:						
Motor	31	1	79	28	116	2
Other	46	5	40	44	117	3
Apparatus:						
Haul seines	-----	-----	2	-----	45	-----
Length, yards	-----	-----	120	-----	8, 990	-----
Gill nets—						
Stake	58	-----	10	186	-----	-----
Square yards	9, 280	-----	1, 000	62, 124	-----	-----
Runaround	12	-----	-----	-----	-----	-----
Square yards	1, 940	-----	-----	-----	-----	-----
Trammel nets	11	1	18	14	13	-----
Square yards	1, 430	450	9, 561	3, 500	4, 458	-----
Lines—						
Hand	26	-----	62	22	188	-----
Hooks	26	-----	62	34	385	-----
Trot, with baits or snoods	9	-----	-----	-----	20	-----
Baits or snoods	900	-----	-----	-----	3, 000	-----
Trot, with hooks	20	-----	-----	-----	-----	-----
Hooks	3, 800	-----	-----	-----	-----	-----
Otter trawls, shrimp	13	-----	60	8	80	-----
Yards at mouth	173	-----	878	103	1, 203	-----
Spears	22	-----	36	9	28	-----
Dredges, oysters	2	-----	14	-----	8	-----
Yards at mouth	2	-----	15	-----	7	-----
Tongs	31	8	88	-----	91	6

Item	Jefferson	Matagorda	Neuces	Refugio	San Patricio
	Number	*Number*	*Number*	*Number*	*Number*
Fishermen:					
On vessels	-----	6	20	-----	10
On boats and shore—					
Regular	-----	127	354	2	99
Casual	4	15	89	6	42
Total	4	148	463	8	151
Vessels, motor:					
5 to 10 tons	-----	1	7	-----	5
11 to 20 tons	-----	1	1	-----	-----
Total	-----	2	8	-----	5
Net tonnage	-----	25	61	-----	35
Boats:					
Motor	-----	44	88	-----	42
Other	4	20	188	8	23
Apparatus:					
Haul seines	-----	-----	16	-----	-----
Length, yards	-----	-----	2, 140	-----	-----
Gill nets—					
Anchor	-----	2	-----	-----	-----
Square yards	-----	2, 000	-----	-----	-----
Stake	-----	-----	129	-----	-----
Square yards	-----	-----	22, 890	-----	-----
Runaround	-----	-----	54	-----	36
Square yards	-----	-----	11, 900	-----	10, 014
Trammel nets	-----	10	9	-----	4
Square yards	-----	4, 252	1, 800	-----	1, 200
Lines—					
Hand	4	-----	113	6	38
Hooks	4	-----	123	6	38
Troll	-----	-----	4	-----	4
Hooks	-----	-----	4	-----	4
Trot, with baits or snoods	4	-----	-----	-----	-----
Baits or snoods	400	-----	-----	-----	-----
Trot, with hooks	-----	-----	6	4	6
Hooks	-----	-----	800	250	650
Otter trawls, shrimp	-----	26	40	-----	37
Yards at mouth	-----	391	563	-----	544
Spears	-----	25	25	-----	30
Dredges, oysters	-----	14	-----	-----	-----
Yards at mouth	-----	13	-----	-----	-----
Tongs	-----	40	64	2	-----

Fisheries of Texas, 1930—Continued

CATCH: BY COUNTIES

Species	Aransas		Brazoria		Calhoun	
	Pounds	Value	Pounds	Value	Pounds	Value
Catfish and bullheads	5, 005	$228	220	$10	10, 558	$480
Croaker	2, 970	108	220	8	1, 980	72
Drum:						
Black	26, 500	1, 000	132	5	9, 760	355
Red or redfish	59, 051	4, 295	3, 300	300	263, 064	22, 881
Flounders	3, 960	360	55	5	6, 957	633
King whiting or "kingfish"	2, 530	92	110	4	1, 650	60
Pompano	690	162			220	50
Sheepshead	1, 320	72	220	12	1, 870	68
Snook or sergeantfish	840	48			825	76
Spanish mackerel	1, 650	90			990	54
Squeteague or "sea trout," spotted	73, 150	7, 980	3, 080	336	254, 859	27, 954
Crabs, hard	13, 486	674				
Shrimp	633, 804	24, 200			1, 216, 139	48, 646
Oysters:						
Market, public, spring	18, 608	1, 223	3, 200	300	81, 700	5, 317
Market, public, fall	41, 809	2, 770	3, 792	356	193, 542	13, 476
Total	885, 373	43, 302	14, 329	1, 336	2, 044, 114	120, 112

Species	Cameron		Galveston		Harris		Jefferson	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Catfish and bullheads	6, 524	$237	12, 620	$575				
Croaker	4, 103	149	9, 900	360				
Drum:								
Black	518, 956	14, 153	5, 216	237			150	$8
Red or redfish	225, 580	20, 507	56, 144	5, 104			880	80
Flounders	440	40	8, 360	1, 065				
Groupers			18, 250	543				
Jewfish			660	18				
King whiting or "kingfish			4, 840	176				
Mullet	3, 741	75	3, 630	132				
Pompano	935	213	1, 320	300				
Sheepshead	6, 831	248	9, 020	517			110	6
Snapper, red	72, 442	7, 244	823, 432	65, 713				
Snook or sergeantfish	19, 081	1, 388	440	22				
Spadefish			550	20				
Spanish mackerel	809	88	4, 620	252				
Squeteague or "sea trout," spotted	234, 700	25, 604	122, 177	14, 090			1, 265	172
Crabs, hard			13, 160	329			2, 400	60
Shrimp	213, 448	7, 485	3, 552, 960	125, 702				
Oysters:								
Market, public, spring	2, 400	400	211, 288	11, 651	3, 040	$285		
Market, public, fall	3, 360	420	75, 340	7, 073	3, 520	330		
Market, private, spring			3, 040	475				
Market, private, fall			4, 704	735				
Total	1, 313, 350	78, 251	4, 941, 671	235, 089	6, 560	615	4, 805	326

Species	Matagorda		Neuces		Refugio		San Patricio	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bluefish			165	$14				
Catfish and bullheads	4, 180	$212	53, 900	2, 450	2, 365	$108	2, 200	$80
Crevalle			154	4				
Croaker	1, 650	60	7, 240	198			3, 850	140
Drum:								
Black	5, 390	230	466, 064	16, 948			19, 800	720
Red or redfish	13, 585	1, 235	199, 293	14, 194	8, 800	640	42, 900	3, 210
Flounders	7, 965	1, 020	38, 060	3, 460			5, 500	500
Groupers			2, 605	87				
Jewfish			220	8			550	30
Kingfish or "king mackerel"			880	40			2, 200	80
King whiting or "kingfish"	2, 750	100	2, 200	80			1, 650	60
Mullet							550	25
Pompano	220	50	8, 580	1, 950			1, 045	238
Sheepshead	1, 540	104	18, 260	756	440	24	2, 640	126
Snapper, red			33, 704	2, 428				
Snook or sergeantfish			15, 400	1, 120			2, 860	162
Spanish mackerel	220	12	63, 800	3, 480			2, 200	200
Squeteague or "sea trout," spotted	22, 858	2, 914	218, 239	20, 848	7, 370	804	105, 655	10, 618
Shrimp	756, 879	26, 737	1, 917, 544	73, 628			1, 898, 544	70, 618
Oysters:								
Market, public, spring	129, 212	11, 210	65, 664	5, 472	640	40		
Market, public, fall	157. 560	9, 790	153, 888	9, 118	1. 008	63		
Total	1, 104, 009	53, 674	3, 265, 860	156, 283	20, 623	1, 679	2, 092, 144	86, 807

Industries related to the fisheries of Texas, 1930

TRANSPORTING IN MATAGORDA COUNTY

Persons engaged on vessels	3
Vessels	1
Net tonnage	6

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Aransas County	Calhoun County	Cameron County	Galveston and Brazoria Counties	Matagorda County	Nueces County	San Patricio County	Total
Establishments	4	11	6	13	7	10	4	55
Persons engaged:								
Proprietors	4	12	5	19	9	12	5	66
Salaried employees	4	6	6	6	3	8	2	35
Wage earners—								
Average for season	31	238	163	297	208	197	236	1,370
Average for year	16	90	87	179	91	95	169	727
Paid to salaried employees	$4,620	$7,080	$7,870	$25,536	$3,320	$8,270	$4,890	$61,586
Paid to wage earners	9,725	24,707	16,548	55,850	33,984	33,533	28,243	202,590
Total salaries and wages	14,345	31,787	24,418	81,386	37,304	41,803	33,133	264,176

PRODUCTS MANUFACTURED

Item		Quantity	Value
Shrimp:			
Packaged, headless—			
Fresh	pounds	112,000	$17,000
Frozen	do	1,485,387	266,878
Canned—			
Wet in tins	standard cases	45,788	276,828
Wet in glass	do	12,092	131,370
Dry in tins	do	9,151	55,426
Oysters, fresh-shucked	gallons	75,416	106,801
Miscellaneous [1]		(2)	31,952
Total			886,255

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 210]

Crab meat, packaged (fresh-cooked)	pounds	577	$144
Shrimp, fresh headless, packaged	do	54,855	3,840
Oysters, fresh-shucked	gallons	34,169	38,391
Total			42,375

[1] Includes fresh-cooked crab meat; sun-dried shrimp; shrimp bran; cooked shrimp; canned oysters; and oyster-shell products.

[2] Data not available.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 196 have also been included as fishermen. This fact should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

FISHERIES OF THE PACIFIC COAST STATES[10]

The yield of fishery products in the Pacific Coast States (Washington, Oregon, and California) during 1930 amounted to 833,388,643 pounds, valued at $23,064,140. This is a decrease of 19 per cent in the volume of the catch and 8 per cent in the value of the catch as compared with the quantity and its value for 1929. Of the total catch in 1930, 806,753,999 pounds, valued at $21,302,721, were fish; 22,790,435 pounds, valued at $1,594,466, were shellfish and miscellaneous products; and 3,844,209 pounds, valued at $166,953, were whale products. These fisheries gave employment to 19,574 fishermen or 2 per cent less than in 1929. Of the total number of fishermen employed during 1930, 6,165 were employed on vessels and 13,409 in the boat and shore fisheries.

Fisheries of the Pacific Coast States, 1930

SUMMARY OF CATCH

Product	Washington		Oregon	
	Pounds	Value	Pounds	Value
Fish	106, 171, 839	$7, 678, 561	25, 484, 812	$2, 180, 428
Shellfish, etc	3, 866, 922	656, 212	973, 949	75, 860
Total	110, 038, 761	8, 334, 773	26, 458, 761	2, 256, 288

Product	California		Total	
	Pounds	Value	Pounds	Value
Fish	675, 097, 348	$11, 443, 732	806, 753, 999	$21, 302, 721
Shellfish, etc	17, 949, 564	862, 394	22, 790, 435	1, 594, 466
Whale products	3, 844, 209	166, 953	3, 844, 209	166, 953
Total	696, 891, 121	12, 473, 079	833, 388, 643	23, 064, 140

OPERATING UNITS: BY STATES

Item	Washington				Oregon		
	Puget Sound district	Coastal district	Columbia River district	Total	Columbia River district	Coastal district	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	2, 265	14	12	2, 291	66	16	82
On boats and shore	1, 952	2, 786	1, 747	6, 485	2, 456	1, 345	3, 801
Total	4, 217	2, 800	1, 759	8, 776	2, 522	1, 361	3, 883
Vessels:							
Steam	2			2			
Net tonnage	29			29			
Motor	338	7	6	351	28	7	35
Net tonnage	6, 817	56	53	6, 926	282	63	345
Sail	4			4			
Net tonnage	1, 418			1, 418			
Total vessels	344	7	6	357	28	7	35
Total net tonnage	8, 264	56	53	8, 373	282	63	345

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[10] With reference to the figures published in this section the reader should refer to that section in the latter part of the book entitled "Statistical survey procedure" which gives in detail methods for collecting statistics, compilation practices, and conversion factors. This is most necessary for a complete understanding of the statistics presented herewith. Data on the operating units and catch of the fisheries of the Pacific Coast States have been taken largely from statistics collected by the various State agencies. Supplementary surveys, compilations, and analyses have been made by agents of this bureau in order that the figures may be presented in a manner comparable with those of other sections.

Fisheries of the Pacific Coast States, 1930—Continued

OPERATING UNITS: BY STATES—Continued

Item	Washington				Oregon		
	Puget Sound district	Coastal district	Columbia River district	Total	Columbia River district	Coastal district	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Boats:							
Motor	1,068	301	890	2,259	1,315	863	2,178
Other	496	234	231	961	86	187	273
Apparatus:							
Purse seines—							
Salmon	197			197			
Length, yards	122,140			122,140			
Haul seines	92		57	149	41	2	43
Length, yards	8,644		16,044	24,688	23,273	866	24,139
Gill nets—							
Drift—							
Salmon	377	106	543	1,026	921	479	1,400
Square yards	644,670	199,192	1,292,883	2,136,745	2,910,360	602,920	3,513,280
Set—							
Salmon	19	271	271	561	183	941	1,124
Square yards	6,726	91,320	66,124	164,170	47,580	151,181	198,761
Lines—							
Trawl, set, and hand	21,906	13	55	21,974	392	95	487
Hooks	476,490	1,300	5,500	483,290	39,200	9,500	48,700
Troll	2,156	64	724	2,944	1,201	517	1,718
Hooks	9,720	224	3,258	13,202	5,400	2,326	7,726
Pound nets	123	100	381	604	61		61
Brush weirs	5			5			
Fish wheels			39	39			
Dip nets	9	30	122	161	184		184
Drag bag nets	51	2		53			
Length, yards	4,261	120		4,381			
Reef nets	2			2			
Beam trawls	33			33			
Yards at mouth	226			226			
Traps—							
Crab	2,369	4,095		6,464		6,690	6,690
Crawfish					986		986
Tongs and rakes	183	27		210		2	2
Shovels	228	2,664		2,892		246	246
Spears		14		14			

Item	California						Grand total
	Northern district	San Francisco district	Monterey district	Southern district		Total	
				San Pedro division	San Diego division		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:							
On vessels	24	345	557	2,025	841	3,792	6,165
On boats and shore	552	997	632	732	210	3,123	13,409
Total	576	1,342	1,189	2,757	1,051	6,915	19,574
Vessels:							
Steam		4				4	6
Net tonnage		153				153	182
Motor	10	30	52	254	117	463	849
Net tonnage	73	408	904	7,707	5,246	14,338	21,609
Sail		4				4	8
Net tonnage		1,722				1,722	3,140
Total vessels	10	38	52	254	117	471	863
Total net tonnage	73	2,283	904	7,707	5,246	16,213	24,931
Boats:							
Motor	206	538	237	405	119	1,505	5,942
Other	212	89	35	41	3	380	1,614

Fisheries of the Pacific Coast States, 1930—Continued

OPERATING UNITS: BY STATES—Continued

Item	California						Grand total
	Northern district	San Francisco district	Monterey district	Southern district		Total	
				San Pedro division	San Diego division		
Apparatus:							
Purse seines—	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Barracuda				33		33	33
Length, yards				14, 228		14, 228	14, 228
Salmon							197
Length, yards							122, 140
Sardine			5	78		83	83
Length, yards			2, 050	31, 747		33, 797	33, 797
Tuna				82		82	82
Length, yards				46, 625		46, 625	46, 625
Lampara nets—							
Sardine		19	62	39	17	137	137
Length, yards		4, 080	20, 756	17, 106	4, 790	46, 732	46, 732
Squid			52			52	52
Length, yards			10, 220			10, 220	10, 220
Other				52		52	52
Length, yards				21, 152		21, 152	21, 152
Haul seines	18	1		1		20	212
Length, yards	2, 685	100		100		2, 885	51, 712
Gill nets—							
Drift—							
Barracuda				38	19	57	57
Square yards				330, 904	94, 804	425, 708	425, 708
Salmon	166	197				363	2, 789
Square yards	158, 253	634, 088				792, 341	6, 442, 366
Sea bass		17	23			40	40
Square yards		38, 070	45, 322			83, 392	83, 392
Shad		133				133	133
Square yards		441, 226				441, 226	441, 226
Striped bass		160				160	160
Square yards		434, 720				434, 720	434, 720
Set—							
Salmon							1, 685
Square yards							362, 931
Sea bass				37	22	59	59
Square yards				152, 625	120, 450	273, 075	273, 075
Miscellaneous—							
Other	12	64	61	37	11	185	185
Square yards	8, 862	108, 177	83, 390	30, 905	6, 826	238, 160	238, 160
Trammel nets			8	35	18	61	61
Square yards			12, 480	255, 500	247, 572	515, 552	515, 552
Lines—							
Trawl, set, and hand	369	619	1, 954	1, 450	735	5, 127	27, 588
Hooks	57, 907	55, 843	140, 631	255, 987	115, 690	626, 058	1, 158, 048
Troll	857	936	1, 214	2, 215	1, 545	6, 767	11, 429
Hooks	4, 040	4, 780	4, 977	2, 215	1, 545	17, 557	38, 485
Pound nets							665
Brush weirs							5
Fish wheels							39
Fyke nets		2, 102				2, 102	2, 102
Dip nets	42					42	387
Bag nets, shrimp		16				16	16
Length, yards		8, 996				8, 996	8, 996
Drag bag nets							53
Length, yards							4, 381
Reef nets							2
Paranzella nets	1	10	1	4		16	16
Yards at mouth	17	170	17	67		271	271
Beam trawls		22				22	55
Yards at mouth		147				147	373
Traps—							
Crab	408	4, 086				4, 494	17, 648
Crawfish							986
Lobster				2, 805	1, 572	4, 377	4, 377
Octopus	10		141			151	151
Harpoons—							
Swordfish and turtle				22	24	46	46
Whale		4				4	4
Tongs and rakes		22	1			23	235
Shovels	9	28	8	61		106	3, 244
Abalone outfits			12	1		13	13
Spears							14

Fisheries of the Pacific Coast States, 1930—Continued

CATCH: BY STATES

Species	Washington		Oregon	
	Pounds	Value	Pounds	Value
FISH				
Carp	214, 729	$6, 441	-------	-------
Cod [2]	9, 977, 023	151, 190	-------	-------
Dolly Varden trout	2, 348	185	-------	-------
Flounders:				
"Sole"	271, 575	10, 320	7, 723	$257
Other	92, 161	2, 673	37, 722	1, 220
Grayfish	371, 180	1, 309	-------	-------
Hake	-------	-------	265	3
Halibut	12, 688, 277	1, 534, 627	412, 644	47, 483
Herring	489, 092	2, 877	138, 756	2, 408
"Lingcod"	1, 022, 303	38, 562	187, 510	4, 595
Perch	59, 853	2, 439	42, 405	945
Rockfishes	637, 082	23, 926	118, 688	3, 422
Sablefish	2, 780, 448	127, 790	190, 269	6, 209
Salmon	72, 746, 074	5, 526, 245	20, 865, 628	1, 925, 337
Shad	531, 815	10, 636	1, 311, 845	26, 240
Skates	1, 170	28	-------	-------
Smelt	2, 140, 055	58, 248	194, 172	4, 219
Steelhead trout	2, 073, 990	178, 243	1, 879, 573	152, 519
Striped bass	-------	-------	15, 664	1, 942
Sturgeon	63, 194	2, 627	78, 782	3, 389
Tuna and tunalike fishes, albacore	-------	-------	3, 166	240
Other fish	9, 470	195	-------	-------
Total	106, 171, 839	7, 678, 561	25, 484, 812	2, 180, 428
SHELLFISH, ETC.				
Crabs	1, 822, 438	115, 288	725, 532	44, 106
Crawfish	-------	-------	176, 800	17, 680
Shrimp	88, 149	6, 699	-------	-------
Clams:				
Hard	514, 748	38, 599	-------	-------
Razor	799, 516	152, 130	38, 372	7, 197
Soft	-------	-------	25, 068	1, 567
Octopus	86, 413	4, 148	-------	-------
Oysters:				
Eastern, market	1, 970	1, 851	-------	-------
Japanese, market	228, 318	82, 875	-------	-------
Native, market	302, 659	250, 502	8, 177	5, 310
Scallops	11, 583	3, 564	-------	-------
Squid	11, 128	556	-------	-------
Total	3, 866, 922	656, 212	973, 949	75, 860
Grand total	110, 038, 761	8, 334, 773	26, 458, 761	2, 256, 288

Species	California [1]		Total	
	Pounds	Value	Pounds	Value
FISH				
Anchovies	319, 561	$4, 214	319, 561	$4, 214
Barracuda	4, 763, 766	379, 122	4, 763, 766	379, 122
Cabrilla	509, 539	27, 090	509, 539	27, 090
Carp	69, 387	1, 490	284, 116	7, 931
Catfish	433, 191	58, 228	433, 191	58, 228
Cod [2]	9, 259, 119	150, 928	19, 236, 142	302, 118
Dolly Varden trout	-------	-------	2, 348	185
Eels	20	2	20	2
Flounders:				
"California halibut"	1, 066, 641	128, 930	1, 066, 641	128, 930
"Sole"	10, 919, 053	659, 840	11, 198, 351	670, 417
Other	1, 019, 876	42, 768	1, 149, 759	46, 661
Flyingfish	48, 458	1, 805	48, 458	1, 805
Grayfish	647, 297	11, 671	1, 018, 477	12, 980
Hake	56, 088	561	56, 353	564
Halfmoon	36, 765	2, 720	36, 765	2, 720
Halibut	445, 077	49, 474	13, 545, 998	1, 631, 584
Hardhead	38, 857	5, 257	38, 857	5, 257
Herring	748, 948	7, 707	1, 376, 796	12, 992

[1] Taken off Pacific coast, including Latin America.
[2] The cod were taken off Alaska.

Fisheries of the Pacific Coast States, 1930—Continued

CATCH: BY STATES—Continued

Species	California		Total	
	Pounds	Value	Pounds	Value
FISH—continued				
Horse mackerel	368, 828	$11, 142	368, 828	$11, 142
Kingfish	457, 158	11, 143	457, 158	11, 143
"Lingcod"	1, 293, 643	54, 909	2, 503, 456	98, 066
Mackerel	16, 531, 364	241, 569	16, 531, 364	241, 569
Mullet	21, 307	1, 950	21, 307	1, 950
Perch	268, 337	11, 201	370, 595	14, 585
Pilchard or sardines	494, 450, 747	2, 377, 432	449, 450, 747	2, 377, 432
Pompano	2, 223	1, 113	2, 223	1, 113
Rock bass	508, 163	32, 417	508, 163	32, 417
Rockfishes	7, 213, 354	281, 154	7, 969, 124	308, 502
Sablefish	1, 361, 494	47, 579	4, 332, 211	181, 578
Salmon	6, 002, 894	528, 765	99, 614, 596	7, 980, 347
Sculpin	89, 656	9, 017	89, 656	9, 017
Sea bass:				
Black	394, 009	19, 878	394, 009	19, 878
White or squeteague	1, 626, 422	144, 482	1, 626, 422	144, 482
Shad	1, 199, 459	45, 314	3, 043, 119	82, 190
Sheepshead	243, 689	9, 035	243, 689	9, 035
Skates	286, 390	5, 753	287, 560	5, 781
Smelt	1, 057, 680	54, 262	3, 391, 907	116, 729
Spanish mackerel	42, 965	2, 041	42, 965	2, 041
Splittail	18, 528	555	18, 528	555
Squawfish	5, 207	300	5, 207	300
Steelhead trout	----------	----------	3, 953, 563	330, 762
Striped bass	866, 808	90, 387	882, 472	92, 329
Sturgeon	----------	----------	141, 976	6, 016
Suckers	1, 990	100	1, 990	100
Swordfish	562, 729	75, 495	562, 729	75, 495
Tomcod	23, 172	926	23, 172	926
Tuna and tunalike fishes:				
Albacore	283, 117	23, 651	286, 283	23, 891
Bluefin	21, 921, 282	1, 238, 017	21, 921, 282	1, 238, 017
Bonito	5, 164, 260	166, 566	5, 164, 260	166, 566
Skipjack or striped tuna	20, 485, 587	789, 836	20, 485, 587	789, 836
Yellowfin	56, 654, 181	3, 396, 217	56, 654, 181	3, 396, 217
Whitebait	179, 438	11, 927	179, 438	11, 927
Whitefish	225, 102	12, 960	225, 102	12, 960
Yellowtail	4, 770, 428	209, 776	4, 770, 428	209, 776
Other fish	134, 094	5, 056	143, 564	5, 251
Total	675, 097, 348	11, 443, 732	806, 753, 999	21, 302, 721
SHELLFISH, ETC.				
Crabs	1, 992, 396	239, 886	4, 540, 366	399, 280
Crawfish	----------	----------	176, 800	17, 680
Sea crawfish or spiny lobster	1, 394, 139	263, 145	1, 394, 139	263, 145
Shrimp	2, 696, 567	42, 272	2, 784, 716	48, 971
Abalone	647, 316	130, 331	647, 316	130, 331
Clams:				
Cockle	30, 051	9, 659	30, 051	9, 659
Hard	----------	----------	514, 748	38, 599
Pismo	21, 772	9, 610	21, 772	9, 610
Razor	----------	----------	837, 888	159, 327
Soft	37, 303	9, 474	62, 371	11, 041
Mixed	5, 162	1, 098	5, 162	1, 098
Mussels	33	6	33	6
Octopus	76, 980	7, 265	163, 393	11, 413
Oysters:				
Eastern, market	72, 796	29, 118	74, 766	30, 969
Japanese, market	----------	----------	228, 318	82, 875
Native, market	4, 949	3, 093	315, 785	258, 905
Scallops	----------	----------	11, 583	3, 564
Squid	10, 969, 462	117, 372	10, 980, 590	117, 928
Terrapin	58	7	58	7
Turtles	580	58	580	58
Total	17, 949, 564	862, 394	22, 790, 435	1, 594, 466
WHALE PRODUCTS				
Whale oil	3, 844, 209	166, 953	3, 844, 209	166, 953
Grand total	696, 891, 121	12, 473, 079	833, 388, 643	23, 064, 140

Industries related to the fisheries of the Pacific Coast States, 1930

Item	Washington	Oregon	California	Total
Transporting:	*Number*	*Number*	*Number*	*Number*
Persons engaged	160	48	41	249
Vessels—				
Steam			1	1
Net tonnage			33	33
Motor	64	27	7	98
Net tonnage	1, 425	286	539	2, 250
Total vessels	64	27	8	99
Total net tonnage	1, 425	286	572	2, 283
Wholesale and manufacturing:				
Establishments	104	54	151	309
Persons engaged—				
Proprietors	125	47	213	385
Salaried employees	194	73	630	897
Wage earners—				
Average for season	2, 134	734	7, 686	10, 554
Average for year	982	459	3, 639	5, 080
Salaries and wages paid	$1, 797, 902	$792, 978	$6, 046, 115	$8, 636, 995
Manufactured products [1]	$11, 150, 491	$5, 087, 826	$29, 720, 076	$45, 958, 393

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[1] These production figures are not comparable with those shown in previous bulletins since packaged fresh and frozen products are now included.

WASHINGTON

Fisheries of Washington, 1930

CATCH: BY DISTRICTS

Species	Puget Sound district		Coastal district		Columbia River district	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Carp			6, 483	$194	208, 246	$6, 247
Cod	9, 977, 023	$151, 190				
Dolly Varden trout	2, 348	185				
Flounders:						
"Sole"	271, 575	10, 320				
Other	92, 161	2, 673				
Grayfish	371, 180	1, 309				
Halibut	12, 684, 759	1, 534, 287	3, 518	340		
Herring	489, 092	2, 877				
"Lingcod"	961, 206	37, 951	61, 097	611		
Perch	58, 421	2, 396	1, 432	43		
Rockfishes	617, 112	23, 748	19, 970	178		
Sablefish	2, 780, 448	127, 790				
Salmon:						
Blueback, red or sockeye	23, 134, 160	2, 100, 949	1, 393, 838	204, 894	295, 032	50, 155
Chinook or king	11, 499, 406	1, 190, 070	1, 396, 129	126, 297	7, 080, 215	861, 104
Chum or keta	10, 120, 120	104, 340	1, 382, 844	6, 914	579, 842	2, 898
Humpback or pink	271, 705	8, 030				
Silver or coho	10, 699, 117	626, 574	2, 047, 855	90, 312	2, 845, 811	153, 708
Shad					531, 815	10, 636
Skates	1, 170	28				
Smelt	416, 999	28, 355	115, 640	5, 782	1, 607, 416	24, 111
Steelhead trout	95, 004	13, 269	108, 910	7, 187	1, 870, 076	157, 787
Sturgeon	1, 064	53	7, 470	224	54, 660	2, 350
Other fish	9, 470	195				
Total	84, 553, 540	5, 966, 589	6, 545, 186	442, 976	15, 073, 113	1, 268, 996
SHELLFISH						
Crabs	443, 278	23, 574	1, 379, 160	91, 714		
Shrimp	88, 149	6, 699				
Clams:						
Hard	507, 983	37, 759	6, 765	840		
Razor			799, 516	152, 130		
Octopus	86, 413	4, 148				
Oysters:						
Eastern, market			1, 970	1, 851		
Japanese, market	69, 646	33, 463	158, 672	49, 412		
Native, market	294, 466	244, 404	8, 193	6, 098		
Scallops	11, 583	3, 564				
Squid	11, 128	556				
Total	1, 512, 646	354, 167	2, 354, 276	302, 045		
Grand total	86, 066, 186	6, 320, 756	8, 899, 462	745, 021	15, 073, 113	1, 268, 996

Fisheries of the Puget Sound district of Washington, 1930

OPERATING UNITS: BY GEAR

Item	Purse seines, salmon	Haul seines	Gill nets		Lines		Pound nets	Brush weirs
			Drift, salmon	Set, salmon	Trawl, set, and hand	Troll		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	1,576	10	5	--------	699	116	24	--------
On boats and shore	50	272	422	13	58	586	195	10
Total	1,626	282	427	13	757	702	219	10
Vessels:								
Motor	190	3	3	--------	104	58	8	--------
Net tonnage	4,390	17	19	--------	2,179	415	181	--------
Sail	--------	--------	--------	--------	4	--------	--------	--------
Net tonnage	--------	--------	--------	--------	1,418	--------	--------	--------
Total vessels	190	3	3	--------	108	58	8	--------
Total net tonnage	4,390	17	19	--------	3,597	415	181	--------
Boats:								
Motor	7	57	366	3	97	438	22	--------
Other	--------	51	8	10	117	--------	118	4
Apparatus:								
Number	197	92	377	19	21,906	2,156	123	5
Length, yards	122,140	8,644	--------	--------	--------	--------	--------	--------
Square yards	--------	--------	644,670	6,726	--------	--------	--------	--------
Hooks	--------	--------	--------	--------	476,490	9,720	--------	--------

Item	Dip nets	Drag bag nets	Reef nets	Beam trawls	Traps, crab	Tongs and rakes	Shovels	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	--------	--------	--------	46	--------	--------	--------	2,265
On boats and shore	9	124	5	30	111	69	228	1,952
Total	9	124	5	76	111	69	228	4,217
Vessels:								
Steam	--------	--------	--------	2	--------	--------	--------	2
Net tonnage	--------	--------	--------	29	--------	--------	--------	29
Motor	--------	--------	--------	17	--------	--------	--------	338
Net tonnage	--------	--------	--------	204	--------	--------	--------	6,817
Sail	--------	--------	--------	--------	--------	--------	--------	4
Net tonnage	--------	--------	--------	--------	--------	--------	--------	1,418
Total vessels	--------	--------	--------	19	--------	--------	--------	344
Total net tonnage	--------	--------	--------	233	--------	--------	--------	8,264
Boats:								
Motor	--------	36	2	14	103	21	--------	1,068
Other	--------	18	2	--------	--------	174	--------	496
Apparatus:								
Number	9	51	2	33	2,369	183	228	--------
Length, yards	--------	4,261	--------	--------	--------	--------	--------	--------
Yards at mouth	--------	--------	--------	226	--------	--------	--------	--------

Fisheries of the Puget Sound district of Washington, 1930—Continued

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets			
					Drift		Set	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Dolly Varden trout	--------	--------	1,995	$160	--------	--------	--------	--------
Flounders:								
"Sole"	--------	--------	8,317	316	--------	--------	1,078	$41
Other	--------	--------	11,007	319	54	$2	--------	--------
Grayfish	--------	--------	99,500	348	--------	--------	5,100	18
Herring	--------	--------	6,075	35	--------	--------	--------	--------
"Lingcod"	--------	--------	1,900	49	--------	--------	--------	--------
Perch	--------	--------	44,156	1,810	--------	--------	--------	--------
Rockfishes	16	$1	11,381	364	--------	--------	--------	--------
Salmon:								
Blueback, red or sockeye	17,502,681	1,497,140	80,122	9,535	23,156	2,756	--------	--------
Chinook or king	533,855	39,508	34,012	4,115	1,098,548	132,924	--------	--------
Chum or keta	9,037,570	90,464	--------	--------	295,080	4,426	--------	--------
Humpback or pink	232,100	6,959	835	25	2,715	73	--------	--------
Silver or coho	4,896,778	275,664	29,272	2,166	521,824	38,615	1,016	75
Skates	--------	--------	376	11	--------	--------	76	2
Smelt	--------	--------	253,960	17,269	--------	--------	--------	--------
Steelhead trout	702	70	--------	--------	25,047	3,507	--------	--------
Sturgeon	168	8	--------	--------	--------	--------	--------	--------
Other fish	--------	--------	754	16	--------	--------	--------	--------
Total	32,203,870	1,909,814	583,662	36,538	1,966,424	182,303	7,270	136
SHELLFISH								
Octopus	--------	--------	--------	--------	--------	--------	1,686	81
Squid	--------	--------	11,128	556	--------	--------	--------	--------
Grand total	32,203,870	1,909,814	594,790	37,094	1,966,424	182,303	8,956	217

Species	Lines				Pound nets		Brush weirs	
	Trawl, set, and hand		Troll					
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Cod	9,977,023	$151,190	--------	--------	--------	--------	--------	--------
Dolly Varden trout	353	25	--------	--------	--------	--------	--------	--------
Flounders:								
"Sole"	58	2	--------	--------	865	$33	--------	--------
Other	--------	--------	--------	--------	2,425	70	--------	--------
Grayfish	140,550	492	--------	--------	--------	--------	--------	--------
Halibut	12,664,547	1,532,297	19,688	$1,928	524	62	--------	--------
Herring	21,647	126	--------	--------	20,300	118	437,800	$2,579
"Lingcod"	863,958	35,314	13,001	433	--------	--------	--------	--------
Perch	1,100	45	--------	--------	185	8	--------	--------
Rockfishes	582,357	22,643	11,035	345	--------	--------	--------	--------
Sablefish	2,780,448	127,790	--------	--------	--------	--------	--------	--------
Salmon:								
Blueback, red or sockeye	--------	--------	609	65	5,525,996	591,282	--------	--------
Chinook or king	--------	--------	5,237,543	553,979	4,595,184	459,518	--------	--------
Chum or keta	--------	--------	--------	--------	786,880	9,443	--------	--------
Humpback or pink	--------	--------	380	10	35,675	963	--------	--------
Silver or coho	--------	--------	2,965,035	161,517	2,282,480	148,361	--------	--------
Skates	18	1	--------	--------	--------	--------	--------	--------
Steelhead trout	--------	--------	--------	--------	69,255	9,692	--------	--------
Sturgeon	--------	--------	--------	--------	896	45	--------	--------
Other fish	423	8	--------	--------	--------	--------	--------	--------
Total	27,032,482	1,869,933	8,247,291	718,277	13,320,665	1,219,595	437,800	2,579
SHELLFISH								
Octopus	84,319	4,047	--------	--------	408	20	--------	--------
Grand total	27,116,801	1,873,980	8,247,291	718,277	13,321,073	1,219,615	437,800	2,579

Fisheries of the Puget Sound district of Washington, 1930—Continued

CATCH: BY GEAR—Continued

Species	Dip nets		Drag bag nets		Reef nets		Beam trawls	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Flounders:								
"Sole"							261, 257	$9, 928
Other							78, 675	2, 282
Grayfish			2, 000	$7			124, 030	444
Herring	3, 170	$18	100	1				
"Lingcod"							82, 347	2, 155
Perch			12, 797	525			183	8
Rockfishes			53	2			12, 270	393
Salmon:								
Blueback, red or sockeye					1, 596	$171		
Chinook or king					264	26		
Chum or keta					590	7		
Silver or coho					2, 712	176		
Skates							700	14
Smelt	481	32	162, 558	11, 054				
Other fish	225	5	3, 953	80			4, 115	86
Total	3, 876	55	181, 461	11, 669	5, 162	380	563, 577	15, 310
SHELLFISH								
Shrimp							88, 149	6, 699
Scallops							11, 583	3, 564
Total							99, 732	10, 263
Grand total	3, 876	55	181, 461	11, 669	5, 162	380	663, 309	25, 573

Species	Traps		Tongs and rakes		Shovels	
	Pounds	Value	Pounds	Value	Pounds	Value
SHELLFISH						
Crabs	443, 278	$23, 574				
Clams, hard					507, 983	$37, 759
Oysters:						
Japanese, market			69, 646	$33, 463		
Native, market			294, 466	244, 404		
Total	443, 278	23, 574	364, 112	277, 867	507, 983	37, 759

Fisheries of the coastal district of Washington, 1930

OPERATING UNITS: BY GEAR

Item	Gill nets		Lines		Pound nets	Dip nets
	Drift, salmon	Set, salmon	Set	Troll		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				12		
On boats and shore	130	190	13	10	61	30
Total	130	190	13	22	61	30
Vessels:						
Motor				6		
Net tonnage				48		
Boats:						
Motor	106	63	4	7	56	
Other		157	9		53	
Apparatus:						
Number	106	271	13	64	100	30
Square yards	199, 192	91, 302				
Hooks			1, 300	224		

Fisheries of the coastal district of Washington, 1930—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Drag bag nets	Traps, crab	Tongs and rakes	Shovels	Spears	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			2			14
On boats and shore	8	121	21	2,664	14	2,786
Total	8	121	23	2,664	14	2,800
Vessels:						
Motor			1			7
Net tonnage			8			56
Boats.						
Motor	2	112	8			301
Other		9	17			234
Apparatus:						
Number	2	4,095	27	2,664	14	
Length, yards	120					

CATCH: BY GEAR

Species	Gill nets				Lines			
	Drift		Set [1]		Set		Troll	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Carp			6,483	$194				
Halibut							3,518	$340
"Lingcod"							61,097	611
Perch					1,432	$43		
Rockfishes							19,970	178
Salmon:								
Blueback, red or sockeye			1,393,838	204,894				
Chinook or king	286,097	$13,160	86,411	3,975			841,024	100,763
Chum or keta	135,684	678	374,940	1,875				
Silver or coho	291,060	11,351	572,650	22,333			535,925	31,347
Steelhead trout	340	22	103,340	6,820				
Sturgeon	7,470	224						
Total	720,651	25,435	2,537,662	240,091	1,432	43	1,461,534	133,239

Species	Pound nets		Dip nets		Drag bag nets	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Salmon:						
Chinook or king	182,597	$8,399				
Chum or keta	872,220	4,361				
Silver or coho	648,220	25,281				
Smelt			105,600	$5,280	10,040	$502
Steelhead trout	5,230	345				
Total	1,708,267	38,386	105,600	5,280	10,040	502

Species	Traps		Tongs and rakes		Shovels	
	Pounds	Value	Pounds	Value	Pounds	Value
SHELLFISH						
Crabs	1,379,160	$91,714				
Clams:						
Hard					6,765	$840
Razor					799,516	152,130
Oysters:						
Eastern, market			1,970	$1,851		
Japanese, market			158,672	49,412		
Native, market			8,193	6,098		
Total	1,379,160	91,714	168,835	57,361	806,281	152,970

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[1] Includes catch by spears.

Fisheries of the Columbia River district of Washington, 1930

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Lines		Pound nets	Fish wheels	Dip nets	Total, exclusive of duplication
		Drift, salmon	Set, salmon	Set	Troll				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					12				12
On boats and shore	498	720	106	29	202	208	26	122	1, 747
Total	498	720	106	29	214	208	26	122	1, 759
Vessels:									
Motor					6				6
Net tonnage					53				53
Boats:									
Motor	44	543	60	20	166	141		68	890
Other	62		46	8		124			231
Apparatus:									
Number	57	543	271	55	724	381	39	122	
Length, yards	16, 044								
Square yards		1, 292, 883	66, 124						
Hooks				5, 500	3, 258				

CATCH: BY GEAR

Species	Haul seines		Gill nets				Lines—Set	
			Drift		Set			
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Carp	208, 246	$6, 247						
Salmon:								
Blueback, red or sockeye	38, 596	6, 561	78, 907	$13, 414	9, 297	$1, 580		
Chinook or king	897, 786	114, 019	3, 119, 732	393, 086	65, 205	8, 216	373	$47
Chum or keta	14, 447	72	187, 761	938	2, 977	15		
Silver or coho	17, 147	823	188, 789	9, 062	2, 754	132		
Shad	331, 169	6, 623	58, 823	1, 176	1, 441	29		
Steelhead trout	255, 355	21, 705	397, 104	33, 754	48, 551	4, 127		
Sturgeon	10, 059	432	24, 029	1, 033	4, 908	211	1, 972	85
Total	1, 772, 805	156, 482	4, 055, 145	452, 463	135, 133	14, 310	2, 345	132

Species	Lines—Troll		Pound nets		Fish wheels		Dip nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Salmon:								
Blueback, red or sockeye			82, 662	$14, 053	54, 934	$9, 339	30, 636	$5, 208
Chinook or king	385, 302	$55, 483	2, 284, 487	249, 009	173, 537	21, 866	153, 793	19, 378
Chum or keta			368, 014	1, 840	1, 024	5	5, 619	28
Silver or coho	1, 594, 381	98, 852	1, 036, 224	44, 558	2, 596	112	3, 920	169
Shad			121, 751	2, 435	18, 631	373		
Smelt							1, 607, 416	24, 111
Steelhead trout	260	22	1, 061, 073	89, 130	26, 861	2, 256	80, 872	6, 793
Sturgeon			10, 523	452	3, 130	135	39	2
Total	1, 979, 943	154, 357	4, 964, 734	401, 477	280, 713	34, 086	1, 882, 295	55, 689

Industries related to the fisheries of Washington, 1930

TRANSPORTING

Item	Puget Sound district	Coastal district	Columbia River district	Total
Persons engaged on vessels	137	2	21	160
Vessels motor:				
5 to 10 tons	8	2	10	20
11 to 20 tons	14		2	16
21 to 30 tons	13			13
31 to 40 tons	8			8
41 to 50 tons	5			5
51 to 60 tons	1			1
81 to 90 tons	1			1
Total	50	2	12	64
Net tonnage	1,291	16	118	1,425

WHOLESALE AND MANUFACTURING

Operating Units, Salaries, and Wages

Item	Puget Sound district	Coastal district	Columbia River district	Total
Establishments	64	32	10	106
Persons engaged:				
Proprietors	84	34	7	125
Salaried employees	146	26	22	194
Wage earners—				
Average for season	1,428	437	269	2,134
Average for year	775	76	131	982
Paid to salaried employees	$521,037	$63,324	$64,875	$649,236
Paid to wage earners	893,984	90,290	164,392	1,148,666
Total salaries and wages	1,415,021	153,614	229,267	1,797,902

Products Manufactured

Item		Quantity	Value
Cod:			
Salted [1]	pounds	3,092,877	$151,190
Salted, packaged	do	662,250	[2] 88,904
Halibut steaks	do	89,938	15,105
Herring, spiced	do	18,300	3,480
Sablefish, salted	do	118,509	8,872
Salmon:			
Fresh steaks	do	34,917	5,565
Mild-cured	do	4,124,000	884,514
Salted	do	45,346	4,929
Kippered (chinook)	do	2,371,258	479,347
Smoked	do	126,062	33,327
Canned—			
Blueback, red or sockeye	standard cases	376,244	5,074,410
Chinook or king	do	101,018	1,592,754
Chum or keta	do	79,763	284,531
Humpback or pink	do	3,712	23,702
Silver or coho	do	141,541	1,294,363
Steelhead trout	do	6,457	86,917
Eggs—			
For food	do	1,667	15,683
For bait	do	2,837	76,931
Shad:			
Canned	do	3,088	8,958
Roe, canned	do	113	3,616
Clams:			
Hard—			
Fresh-shucked	gallons	4,100	6,211
Canned, whole, minced, and juice	standard cases	17,856	78,353
Razor—			
Canned, whole, minced, chowder, and juice	do	45,153	416,349

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[1] The cod were salted in Alaskan waters.

[2] This figure is included in the total, however, it should be explained that it represents a further manufacture of salted cod already included in the table.

Industries related to the fisheries of Washington, 1930—Continued

WHOLESALE AND MANUFACTURING—Continued

PRODUCTS MANUFACTURED—Continued

Item	Quantity	Value
Oysters:		
Western, fresh-shucked ... gallons	28, 375	$225, 241
Japanese, fresh-shucked ... do	25, 000	87, 500
Unclassified products		
Packaged [3]	(4)	47, 992
Canned [5] ... standard cases	312	4, 420
Meal, salmon and halibut [6] ... tons	1, 050	70, 071
Oil, salmon and halibut ... gallons	122, 458	29, 973
Miscellaneous [7]	(4)	47, 283
Total		11, 150, 491

[3] Includes fresh and frozen steaks of "lingcod" and rockfish; packaged fresh crab meat; and fresh-shucked eastern oysters and scallops.

[4] Data not available.

[5] Includes canned herring for bait and dog and cat food.

[6] Includes small amount of salmon-egg meal.

[7] Includes canned sturgeon and crabs; smoked herring; kippered sablefish; and mild-cured shad.

NOTE.—Some of the above products may be have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State.

OREGON

Fisheries of Oregon, 1930

CATCH: BY DISTRICTS

Species	Columbia River district		Coastal district	
	Pounds	Value	Pounds	Value
FISH				
Flounders:				
"Sole"	3, 272	$125	4, 451	$132
Other			37, 722	1, 220
Hake			265	3
Halibut	137, 069	17, 623	275, 575	29, 860
Herring			138, 756	2, 408
"Lingcod"	53, 907	1, 868	133, 603	2, 727
Perch			42, 405	945
Rockfishes	26, 080	768	92, 608	2, 654
Sablefish	83, 645	3, 017	106, 624	3, 192
Salmon:				
Blueback, red or sockeye	279, 674	47, 575		
Chinook or king	10, 548, 627	1, 334, 326	1, 315, 782	112, 330
Chum or keta	318, 771	1, 594	266, 843	1, 334
Silver or coho	3, 580, 402	210, 810	4, 555, 529	217, 368
Shad	832, 518	16, 651	479, 327	9, 589
Smelt	188, 229	3, 893	5, 943	326
Steelhead trout	1, 488, 220	126, 124	391, 353	26, 395
Striped bass			15, 664	1, 942
Sturgeon	74, 581	3, 207	4, 201	182
Tuna, albacore	255	33	2, 911	207
Total	17, 615, 250	1, 767, 614	7, 869, 562	412, 814
SHELLFISH				
Crabs			725, 532	44, 106
Crawfish	176, 800	17, 680		
Clams:				
Razor			38, 372	7, 197
Soft			25, 068	1, 567
Oysters, native, market			8, 177	5, 310
Total	176, 800	17, 680	797, 149	58, 180
Grand total	17, 792, 050	1, 785, 294	8, 666, 711	470, 994

Fisheries of the Columbia River district of Oregon, 1930

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Lines		Pound nets	Dip nets	Traps, crawfish	Total, exclusive of duplication
		Drift, salmon	Set, salmon	Trawl and set	Troll				
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	----	----	----	22	44	----	----	----	66
On boats and shore	530	1, 310	86	58	290	37	184	58	2, 456
Total	530	1, 310	86	80	334	37	184	58	2, 522
Vessels, motor	----	----	----	6	22	----	----	----	28
Net tonnage	----	----	----	65	217	----	----	----	282
Boats:									
Motor	32	921	84	46	248	22	----	46	1, 315
Other	46	----	3	12	----	18	----	12	86
Apparatus:									
Number	41	921	183	392	1, 201	61	184	986	----
Length, yards	23, 273	----	----	----	----	----	----	----	----
Square yards	----	2, 910, 360	47, 580	----	----	----	----	----	----
Hooks	----	----	----	39, 200	5, 400	----	----	----	----

CATCH: BY GEAR

Species	Haul seines		Gill nets		Lines—Trawl and set	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Flounders; "Sole"	----	----	----	----	3, 272	$123
Halibut	----	----	----	----	137, 069	17, 623
"Lingcod"	----	----	----	----	53, 907	1, 868
Rockfishes	----	----	----	----	26, 080	768
Sablefish	----	----	----	----	83, 645	3, 017
Salmon:						
Blueback, red or sockeye	76, 154	$12, 946	165, 579	$28, 179	----	----
Chinook or king	1, 887, 311	237, 801	7, 428, 041	935, 933	----	----
Chum or keta	23, 827	119	252, 314	1, 262	----	----
Silver or coho	49, 488	2, 375	353, 808	16, 983	----	----
Shad	626, 937	12, 539	157, 645	3, 153	----	----
Smelt	----	----	53, 500	1, 872	----	----
Steelhead trout	479, 589	40, 765	631, 949	53, 716	----	----
Sturgeon	1, 556	67	41, 181	1, 771	29, 491	1, 268
Tuna, albacore	----	----	----	----	255	33
Total	3, 144, 862	306, 612	9, 084, 017	1, 042, 869	333, 719	24, 702

Species	Lines—Troll		Pound nets		Dip nets		Traps	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Salmon:								
Blueback, red or sockeye	----	----	23, 077	$3, 923	14, 864	$2, 527	----	----
Chinook or king	624, 179	$89, 882	355, 078	38, 704	254, 018	32, 006	----	----
Chum or keta	----	----	41, 357	207	1, 273	6	----	----
Silver or coho	2, 886, 150	178, 941	287, 606	12, 367	3, 350	144	----	----
Shad	----	----	47, 851	957	85	2	----	----
Smelt	----	----	----	----	134, 729	2, 021	----	----
Steelhead trout	1, 066	91	296, 533	24, 909	79, 083	6, 643	----	----
Sturgeon	----	----	1, 739	75	614	26	----	----
SHELLFISH								
Crawfish	----	----	----	----	----	----	176, 800	$17, 680
Total	3, 511, 395	268, 914	1, 053, 241	81, 142	488, 016	43, 375	176, 800	17, 680

Fisheries of the coastal district of Oregon, 1930

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Lines		Traps, crab	Tongs	Shovels	Total, exclusive of duplication
		Drift, salmon	Set, salmon	Trawl and set	Troll				
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels				6	12				16
On boats and shore	6	640	319	2	138	223	2	246	1, 345
Total	6	640	319	8	150	223	2	246	1, 361
Vessels:									
Motor				2	6				7
Net tonnage				24	47				63
Boats:									
Motor	2	472	174	1	116	198	1		863
Other	2	7	161			25	2		187
Apparatus:									
Number	2	479	941	95	517	6, 690	2	246	
Length, yards	866								
Square yards		602, 920	151, 181						
Hooks				9, 500	2, 326				

CATCH: BY GEAR

Species	Haul seines		Gill nets		Lines			
					Trawl and set		Troll	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Flounders:								
"Sole"	475	$12			3, 976	$120		
Other	6, 104	232	19, 321	$563	12, 297	425		
Hake	265	3						
Halibut					273, 698	29, 663	1, 877	$197
Herring	6, 822	120	131, 934	2, 288				
"Lingcod"					91, 132	1, 863	42, 471	864
Perch	3, 229	98	39, 176	847				
Rockfishes					71, 722	2, 084	20, 886	570
Sablefish					106, 624	3, 192		
Salmon:								
Chinook or king			1, 035, 324	85, 686			280, 458	26, 664
Chum or keta			266, 813	1, 334				
Silver or coho			2, 957, 095	119, 864			1, 598, 434	97, 504
Shad			479, 327	9, 589				
Smelt	856	43	5, 087	283				
Steelhead trout			390, 348	26, 325			1, 005	70
Striped bass	614	74	15, 050	1, 868				
Sturgeon			4, 158	179	20	2	23	1
Tuna, albacore					20	2	2, 891	205
Total	18, 365	582	5, 343, 663	248, 826	559, 489	37, 351	1, 948, 045	126, 055

Species	Traps		Tongs		Shovels	
	Pounds	Value	Pounds	Value	Pounds	Value
SHELLFISH						
Crabs	725, 532	$44, 106				
Clams:						
Razor					38, 372	$7, 197
Soft					25, 068	1, 567
Oysters, native, market			8, 177	$5, 310		
Total	725, 532	44, 106	8, 177	5, 310	63, 440	8, 764

Industries related to the fisheries of Oregon, 1930

TRANSPORTING IN COLUMBIA RIVER DISTRICT

Persons engaged on vessels	48
Vessels, motor:	
5 to 10 tons	18
11 to 20 tons	9
Total	27
Net tonnage	286

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Columbia River district	Coastal district	Total
Establishments	35	19	54
Persons engaged:			
Proprietors	32	15	47
Salaried employees	56	17	73
Wage earners—			
Average for season	660	74	734
Average for year	409	50	459
Paid to salaried employees	$199, 844	$55, 685	$255, 529
Paid to wage earners	478, 246	59, 203	537, 449
Total salaries and wages	678, 090	114, 888	792, 978

PRODUCTS MANUFACTURED

Item	Quantity	Value
Salmon:		
Mild-cured pounds	546, 150	$123, 317
Canned—		
Blueback, red or sockeye standard cases	5, 923	124, 383
Chinook or king do	206, 276	3, 227, 599
Chum or keta do	8, 649	29, 671
Silver or coho do	106, 868	1, 138, 930
Steelhead do	11, 588	183, 496
Shad:		
Canned do	7, 364	26, 114
Roe, canned do	813	26, 004
Crab meat, packaged (fresh-cooked) pounds	126, 475	59, 365
Clams, razor: Canned, whole, minced, and juice standard cases	956	8, 631
Oysters, western, fresh-shucked gallons	9, 530	70, 884
Other products [1]	(2)	69, 432
Total		5, 087, 826

[1] Includes salted sablefish; canned crabs; fresh-shucked eastern and Japanese oysters; canned salmon eggs (for bait); salmon meal; and salmon oil.

[2] Data not available.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State.

CALIFORNIA

Fisheries of California, 1930

CATCH: BY DISTRICTS

Species	Northern district		San Francisco district		Monterey district	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Anchovies			261, 850	$3, 142	43, 500	$749
Barracuda					30	3
Carp			67, 012	1, 315		
Catfish	43, 343	$6, 401	389, 848	51, 827		
Cod			9, 259, 119	150, 928		
Eels			10	1		
Flounders:						
"California halibut"					24, 412	2, 799
"Sole"	1, 569, 399	95, 889	8, 059, 671	493, 201	904, 119	53, 843
Other	82, 203	3, 489	815, 450	34, 064	104, 739	4, 477
Grayfish	2, 345	23	221, 672	2, 212	8, 925	89
Hake			50, 983	510	5, 105	51
Halibut	413, 958	46, 519	31, 119	2, 955		
Hardhead			38, 857	5, 257		
Herring	103, 183	1, 692	601, 927	5, 437		
Horse mackerel					95, 271	1, 030
Kingfish			40, 337	1, 230	124, 607	4, 286
"Lingcod"	511, 979	20, 067	581, 902	24, 514	196, 354	10, 150
Mackerel			12, 362	371	1, 363, 106	42, 489
Perch	32, 426	1, 296	112, 486	5, 639	14, 957	694
Pilchard or sardine			48, 468, 957	195, 812	259, 097, 933	1, 177, 617
Pompano					516	214
Rock bass					16	1
Rockfishes	253, 568	8, 480	1, 027, 496	34, 321	2, 825, 970	98, 261
Sablefish	627, 051	26, 387	461, 348	12, 421	267, 589	8, 366
Salmon	3, 501, 539	287, 900	2, 221, 940	209, 336	279, 409	31, 528
Sculpin	229	5			817	21
Sea bass, white or squeteague	216	7	48, 334	3, 513	45, 677	3, 069
Shad			1, 199, 459	45, 314		
Skates	3, 030	61	221, 324	4, 426	28, 871	570
Smelt	72, 893	4, 528	198, 406	10, 937	339, 963	18, 105
Splittail			18, 528	555		
Squawfish			5, 207	300		
Striped bass			866, 808	90, 387		
Suckers			1, 990	100		
Tomcod	712	28	22, 460	898		
Tuna and tunalike fishes:						
Albacore					172, 962	12, 570
Bonito					1, 166	58
Whitebait	144, 754	8, 974	31, 633	2, 688	2, 996	261
Other fish	70, 343	1, 677	12, 156	277	12, 731	528
Total	7, 433, 171	513, 423	75, 350, 651	1, 393, 888	265, 961, 741	1, 471, 829
SHELLFISH, ETC.						
Crabs	92, 448	9, 638	1, 898, 832	230, 083	1, 104	162
Shrimp			2, 687, 831	40, 318	8, 736	1, 954
Abalone					631, 795	126, 359
Clams:						
Cockle	7	2	21, 534	7, 594		
Pismo					2, 409	1, 230
Soft			37, 303	9, 474		
Mixed	4, 916	1, 028	246	70		
Mussels			3	1	30	5
Octopus	5, 141	410	8, 578	740	63, 003	6, 069
Oysters:						
Eastern, market			72, 796	29, 118		
Native, market			4, 949	3, 093		
Squid					10, 937, 974	115, 614
Terrapin			58	7		
Total	102, 512	11, 078	4, 732, 130	320, 498	11, 645, 051	251, 393
WHALE PRODUCTS						
Whale oil			3, 844, 209	166, 953		
Grand total	7, 535, 683	524, 501	83, 926, 990	1, 881, 339	277, 606, 792	1, 723, 222

Fisheries of California, 1930—Continued

CATCH: BY DISTRICTS—Continued

Species	Southern district—Off California			
	San Pedro division		San Diego division	
	Pounds	Value	Pounds	Value
FISH				
Anchovies	10, 311	$284	3, 900	$39
Barracuda	2, 554, 875	186, 151	958, 703	63, 107
Cabrilla			471	17
Carp	2, 375	175		
Eels	10	1		
Flounders:				
“California halibut”	731, 066	93, 132	109, 465	11, 829
“Sole”	379, 366	16, 324	6, 498	583
Other	17, 341	728	43	3
Flyingfish	48, 458	1, 805		
Grayfish	288, 167	8, 703	124, 633	582
Halfmoon	36, 765	2, 720		
Herring	259	13	43, 579	565
Horse mackerel	273, 557	10, 112		
Kingfish	289, 743	5, 548	2, 471	79
“Lingcod”	3, 408	178		
Mackerel	14, 473, 352	184, 846	681, 280	13, 840
Mullet	11, 096	1, 055	9, 657	858
Perch	104, 431	3, 444	3, 377	98
Pilchard or sardine	182, 711, 875	977, 784	4, 171, 982	26, 219
Pompano	1, 351	757	356	142
Rock bass	345, 636	24, 459	130, 020	5, 644
Rockfishes	2, 044, 311	89, 218	1, 053, 604	50, 445
Sablefish	5, 506	405		
Salmon	6	1		
Sculpin	65, 567	7, 009	23, 043	1, 982
Sea bass:				
Black	103, 246	5, 292	84, 227	3, 690
White or squeteague	886, 685	80, 406	258, 373	18, 818
Sheepshead	203, 593	7, 470	37, 461	1, 454
Skates	31, 410	662	1, 755	34
Smelt	431, 409	19, 874	13, 927	739
Swordfish	196, 425	26, 609	365, 070	48, 732
Tuna and tunalike fishes:				
Albacore	107, 987	10, 857	2, 168	224
Bluefin	15, 443, 346	881, 976	155, 546	8, 556
Bonito	2, 624, 642	83, 143	1, 240, 688	38, 363
Skipjack or striped tuna	1, 109, 680	44, 387	1, 905, 595	76, 224
Yellowfin	12, 564	795	22, 989	1, 379
Whitebait	55	4		
Whitefish	115, 299	8, 630	99, 267	3, 836
Yellowtail	241, 838	13, 498	973, 121	39, 069
Other fish	33, 990	2, 338		
Total	225, 941, 001	2, 800, 793	12, 483, 269	417, 150
SHELLFISH, ETC.				
Crabs	12	3		
Sea crawfish or spiny lobster	267, 670	53, 160	106, 780	21, 074
Abalone	15, 521	3, 972		
Clams:				
Cockle	8, 510	2, 063		
Pismo	19, 363	8, 380		
Octopus	258	46		
Squid	30, 376	1, 672	1, 112	86
Total	341, 710	69, 296	107, 892	21, 160
Grand total	226, 282, 711	2, 870, 089	12, 591, 161	438, 310

Fisheries of California, 1930—Continued

CATCH: By districts—Continued

Species	Southern district—Off Latin America				Total southern district	
	San Pedro division		San Diego division			
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Anchovies					14, 211	$323
Barracuda	937, 715	$96, 374	312, 443	$33, 487	4, 763, 736	379, 119
Cabrilla	387, 394	22, 545	121, 674	4, 528	509, 539	27, 090
Carp					2, 375	175
Eels					10	1
Flounders:						
“California halibut”	12, 562	1, 234	189, 136	19, 936	1, 042, 229	126, 131
“Sole”					385, 864	16, 907
Other	100	7			17, 484	738
Flyingfish					48, 458	1, 805
Grayfish	1, 555	62			414, 355	9, 347
Halfmoon					36, 765	2, 720
Herring					43, 838	578
Horse mackerel					273, 557	10, 112
Kingfish					292, 214	5, 627
“Lingcod”					3, 408	178
Mackerel			1, 264	23	15, 155, 896	198, 709
Mullet	554	37			21, 307	1, 950
Perch	660	30			108, 468	3, 572
Pilchard or sardine					186, 883, 857	1, 004, 003
Pompano					1, 707	899
Rock bass	13, 972	822	18, 519	1, 491	508, 147	32, 416
Rockfishes			8, 405	429	3, 106, 320	140, 092
Sablefish					5, 506	405
Salmon					6	1
Sculpin					88, 610	8, 991
Sea bass:						
Black	71, 152	3, 818	135, 384	7, 078	394, 009	19, 878
White or squeteague	128, 193	14, 426	258, 944	24, 243	1, 532, 195	137, 893
Sheepshead	377	15	2, 258	96	243, 689	9, 035
Skates					33, 165	696
Smelt			1, 082	79	446, 418	20, 692
Spanish mackerel	19, 620	1, 284	23, 345	757	42, 965	2, 041
Swordfish			1, 234	154	562, 729	75, 495
Tuna and tunalike fishes:						
Albacore					110, 155	11, 081
Bluefin	6, 150, 000	338, 341	172, 390	9, 144	21, 921, 282	1, 238, 017
Bonito	1, 214, 567	42, 123	83, 197	2, 879	5, 163, 094	166, 508
Skipjack or striped tuna	5, 737, 340	203, 878	11, 732, 972	465, 347	20, 485, 587	789, 836
Yellowfin	12, 537, 771	754, 534	44, 080, 857	2, 639, 509	56, 654, 181	3, 396, 217
Whitebait					55	4
Whitefish	360	24	10, 176	470	225, 102	12, 960
Yellowtail	2, 414, 674	111, 829	1, 140, 795	45, 380	4, 770, 428	209, 776
Other fish	4, 874	236			38, 864	2, 574
Total	29, 633, 440	1, 591, 619	58, 294, 075	3, 255, 030	326, 351, 785	8, 064, 592
SHELLFISH, ETC.						
Crabs					12	3
Sea crawfish or spiny lobster			1, 019, 689	188, 911	1, 394, 139	263, 145
Abalone					15, 521	3, 972
Clams:						
Cockle					8, 510	2, 063
Pismo					19, 363	8, 380
Octopus					258	46
Squid					31, 488	1, 758
Turtles			580	58	580	58
Total			1, 020, 269	188, 969	1, 469, 871	279, 425
Grand total	29, 633, 440	1, 591, 619	59, 314, 344	3, 443, 999	327, 821, 656	8, 344, 017

Fisheries of California, 1930—Continued

CATCH: BY WATERS

Species	Off California [1]		Off Latin America	
	Pounds	Value	Pounds	Value
FISH				
Anchovies	319, 561	$4, 214		
Barracuda	3, 513, 608	249, 261	1, 250, 158	$129, 861
Cabrillo	471	17	509, 068	27, 073
Carp	69, 387	1, 490		
Catfish	433, 191	58, 228		
Cod	9, 259, 119	150, 928		
Eels	20	2		
Flounders:				
"California halibut"	864, 943	107, 760	201, 698	21, 170
"Sole"	10, 919, 053	659, 840		
Other	1, 019, 776	42, 761	100	7
Flyingfish	48, 458	1, 805		
Grayfish	645, 742	11, 609	1, 555	62
Hake	56, 088	561		
Halfmoon	36, 765	2, 720		
Halibut	445, 077	49, 474		
Hardhead	38, 857	5, 257		
Herring	748, 948	7, 707		
Horse mackerel	368, 828	11, 142		
Kingfish	457, 158	11, 143		
"Lingcod"	1, 293, 643	54, 909		
Mackerel	16, 530, 100	241, 546	1, 264	23
Mullet	20, 753	1, 913	554	37
Perch	267, 677	11, 171	660	30
Pilchard or sardine	494, 450, 747	2, 377, 432		
Pompano	2, 223	1, 113		
Rock bass	475, 672	30, 104	32, 491	2, 313
Rockfishes	7, 204, 949	280, 725	8, 405	429
Sablefish	1, 361, 494	47, 579		
Salmon	6, 002, 894	528, 765		
Sculpin	89, 656	9, 017		
Sea bass:				
Black	187, 473	8, 982	206, 536	10, 896
White or squeteague	1, 239, 285	105, 813	387, 137	38, 669
Shad	1, 199, 459	45, 314		
Sheepshead	241, 054	8, 924	2, 635	111
Skates	286, 390	5, 753		
Smelt	1, 056, 598	54, 183	1, 082	79
Spanish mackerel			42, 965	2, 041
Splittail	18, 528	555		
Squawfish	5, 207	300		
Striped bass	866, 808	90, 387		
Suckers	1, 990	100		
Swordfish	561, 495	75, 341	1, 234	154
Tomcod	23, 172	926		
Tuna and tunalike fishes:				
Albacore	283, 117	23, 651		
Bluefin	15, 598, 892	890, 532	6, 322, 390	347, 485
Bonito	3, 866, 496	121, 564	1, 297, 764	45, 002
Skipjack or striped tuna	3, 015, 275	120, 611	17, 470, 312	669, 225
Yellowfin	35, 553	2, 174	56, 618, 628	3, 394, 043
Whitebait	179, 438	11, 927		
Whitefish	214, 566	12, 466	10, 536	494
Yellowtail	1, 214, 959	52, 567	3, 555, 469	157, 209
Other fish	129, 220	4, 820	4, 874	236
Total	587, 169, 833	6, 597, 083	87, 927, 515	4, 846, 649
SHELLFISH, ETC.				
Crabs	1, 992, 396	239, 886		
Shrimp	2, 696, 567	42, 272		
Sea crawfish or spiny lobster	374, 450	74, 234	1, 019, 689	188, 911
Abalone	647, 316	130, 331		
Clams:				
Cockle	30, 051	9, 659		
Pismo	21, 772	9, 610		
Soft	37, 303	9, 474		
Mixed	5, 162	1, 098		
Mussels	33	6		
Octopus	76, 980	7, 265		
Oysters:				
Eastern, market	72, 796	29, 118		
Native, market	4, 949	3, 093		

[1] The catch of cod was taken in Alaska waters.

Fisheries of California, 1930—Continued

CATCH: BY WATERS—Continued

Species	Off California		Off Latin America	
	Pounds	Value	Pounds	Value
SHELLFISH, ETC.—continued				
Squid	10,969,462	$117,372		
Terrapin	58	7		
Turtles			580	$58
Total	16,929,295	673,425	1,020,269	188,969
WHALE PRODUCTS				
Whale oil	3,844,209	166,953		
Grand total	607,943,337	7,437,461	88,947,784	5,035,618

Fisheries of the northern district of California, 1930

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Lines	
		Drift, salmon	Other	Set and hand	Troll
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				16	14
On boats and shore	32	251	13	156	234
Total	32	251	13	172	248
Vessels:					
Motor				7	7
Net tonnage				52	52
Boats:					
Motor	17		12	103	198
Other	4	166		17	
Apparatus:					
Number	18	166	12	369	857
Length, yards	2,685				
Square yards		158,253	8,862		
Hooks				57,907	4,040

Item	Dip nets	Paranzella nets	Traps		Shovels	Total, exclusive of duplication
			Crab	Octopus		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		6				24
On boats and shore	42		28	1	9	552
Total	42	6	28	1	9	576
Vessels:						
Motor		2				10
Net tonnage		14				73
Boats:						
Motor			22	1		206
Other	42					212
Apparatus:						
Number	42	1	408	10	9	
Yards at mouth		17				

Fisheries of the northern district of California, 1930—Continued

CATCH: BY GEAR

Species	Haul seines		Gill nets		Lines			
					Set and hand		Troll	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Catfish	-------	-------	-------	-------	43, 343	$6, 401	-------	-------
Flounders:								
"Sole"	-------	-------	-------	-------	5, 021	149	-------	-------
Other	3, 962	$180	-------	-------	-------	-------	-------	-------
Halibut	-------	-------	-------	-------	400, 613	45, 258	11, 443	$1, 080
Herring	103, 183	1, 692	-------	-------	-------	-------	-------	-------
"Lingcod"	-------	-------	-------	-------	246, 597	10, 040	45, 227	1, 221
Perch	31, 561	1, 262	801	$32	-------	-------	-------	-------
Rockfishes	-------	-------	-------	-------	159, 395	5, 530	5, 583	115
Sablefish	-------	-------	-------	-------	618, 754	26, 180	-------	-------
Salmon	30, 436	1, 515	667, 975	64, 354	-------	-------	2, 803, 128	222, 031
Sculpin	-------	-------	-------	-------	229	5	-------	-------
Sea bass, white or squeteague	-------	-------	-------	-------	216	7	-------	-------
Smelt	39, 559	2, 323	25, 881	1, 790	-------	-------	-------	-------
Whitebait	3, 378	139	214	8	-------	-------	-------	-------
Other fish	-------	-------	153	10	67, 867	1, 605	598	15
Total	212, 079	7, 111	695, 024	66, 194	1, 542, 035	95, 175	2, 865, 979	224, 462
SHELLFISH								
Octopus	-------	-------	-------	-------	953	75	-------	-------
Grand total	212, 079	7, 111	695, 024	66, 194	1, 542, 988	95, 250	2, 865, 979	224, 462

Species	Dip nets		Paranzella nets		Traps		Shovels	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Flounders:								
"Sole"	-------	-------	1, 564, 378	$95, 740	-------	-------	-------	-------
Other	42	$2	78, 199	3, 307	-------	-------	-------	-------
Grayfish	-------	-------	2, 345	23	-------	-------	-------	-------
Halibut	-------	-------	1, 902	181	-------	-------	-------	-------
"Lingcod"	-------	-------	220, 155	8, 806	-------	-------	-------	-------
Perch	64	2	-------	-------	-------	-------	-------	-------
Rockfishes	-------	-------	88, 590	2, 835	-------	-------	-------	-------
Sablefish	-------	-------	8, 297	207	-------	-------	-------	-------
Skates	-------	-------	3, 030	61	-------	-------	-------	-------
Smelt	7, 453	415	-------	-------	-------	-------	-------	-------
Tomcod	-------	-------	712	28	-------	-------	-------	-------
Whitebait	141, 162	8, 827	-------	-------	-------	-------	-------	-------
Other fish	115	7	1, 610	40	-------	-------	-------	-------
Total	148, 836	9, 253	1, 969, 218	111, 228	-------	-------	-------	-------
SHELLFISH								
Crabs	-------	-------	-------	-------	92, 448	$9, 638	-------	-------
Clams:								
Cockle	-------	-------	-------	-------	-------	-------	7	$2
Mixed	-------	-------	-------	-------	-------	-------	4, 916	1, 028
Octopus	-------	-------	-------	-------	4, 188	335	-------	-------
Total	-------	-------	-------	-------	96, 636	9, 973	4, 923	1, 030

Fisheries of the San Francisco district of California, 1930

OPERATING UNITS: BY GEAR

Item	Lampara nets, sardine	Haul seines	Gill nets					Lines	
			Drift, salmon	Drift, sea bass	Drift, shad	Drift, striped bass	Other	Set and hand	Troll
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	68							133	2
On boats and shore	69	3	364	23	253	289	70	70	270
Total	137	3	364	23	253	289	70	203	272
Vessels:									
Motor	7							1	1
Net tonnage	76							9	19
Sail								4	
Net tonnage								1,722	
Total vessels	7							5	1
Total net tonnage	76							1,731	19
Boats:									
Motor	12		187	15	126	151	37	81	255
Other		1	10	2	7	9	2	10	
Apparatus:									
Number	19	1	197	17	133	160	64	619	936
Length, yards	4,080	100							
Square yards			634,088	38,070	441,226	434,720	108,177		
Hooks								55,843	4,780

Item	Fyke nets	Bag nets	Paranzella nets	Beam trawls	Traps	Harpoons, whaling	Tongs	Rakes	Shovels	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		14	86			44				345
On boats and shore	97	52		22	207		21	1	28	997
Total	97	66	86	22	207	44	21	1	28	1,342
Vessels:										
Steam						4				4
Net tonnage						153				153
Motor		3	20							30
Net tonnage		20	312							408
Sail										4
Net tonnage										1,722
Total vessels		3	20			4				38
Total net tonnage		20	312			153				2,283
Boats:										
Motor	31	8		22	206		7			538
Other	40	5					14	1	28	89
Apparatus:										
Number	2,102	16	10	22	4,086	4	21	1	28	
Length, yards		8,996								
Yards at mouth			170	147						

Fisheries of the San Francisco district of California, 1930—Continued

CATCH: BY GEAR

Species	Lampara nets		Haul seines		Gill nets	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Anchovies	261, 850	$3, 142				
Carp			4, 835	$232	43, 589	$705
Flounders, other	843	32			1, 302	31
Grayfish	2, 460	25			12, 602	126
Herring	3, 485	51			598, 442	5, 386
Kingfish	22, 160	776				
Mackerel	12, 246	367			116	4
Perch	1, 711	102			110, 550	5, 528
Pilchard or sardine	48, 468, 957	195, 812				
Salmon					1, 214, 084	109, 762
Sea bass, white or squeteague	3, 739	280			44, 403	3, 219
Shad					1, 199, 459	45, 314
Smelt	4, 844	291			193, 562	10, 646
Squawfish					1, 455	51
Striped bass					851, 417	88, 485
Suckers					33	2
Tomcod	15, 450	618			108	4
Whitebait	30, 758	2, 614			875	74
Other fish					1, 616	49
Total	48, 828, 503	204, 110	4, 835	232	4, 273, 613	269, 386

Species	Lines				Fyke nets		Bag nets	
	Set and hand		Troll					
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Carp					18, 588	$378		
Catfish					389, 848	51, 827		
Cod	9, 259, 119	$150, 928						
Eels	10	1						
Flounders:								
"Sole"	3, 146	142						
Other	367	9						
Grayfish	6, 822	68	1, 700	$12				
Halibut	391	38	669	61				
Hardhead					38, 857	5, 257		
"Lingcod"	267, 162	12, 022	7, 298	194				
Rockfishes	492, 075	17, 223	3, 020	61				
Sablefish	118, 203	3, 842						
Salmon			1, 007, 856	99, 574				
Sea bass, white or squeteague			192	14				
Splittail					18, 528	555		
Squawfish					3, 752	249		
Striped bass	15, 391	1, 902						
Suckers					1, 957	98		
Other fish	2, 166	54	487	11	220	10		
Total	10, 164, 852	186, 229	1, 021, 222	99, 927	471, 750	58, 374		
SHELLFISH, ETC.								
Shrimp							1, 296, 247	$19, 444
Octopus	7, 527	677						
Grand total	10, 172, 379	186, 906	1, 021, 222	99, 927	471, 750	58, 374	1, 296, 247	19, 444

Fisheries of the San Francisco district of California, 1930—Continued

CATCH: By gear—Continued

Species	Paranzella nets		Beam trawls		Traps		Harpoons	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Flounders:								
"Sole"	8,056,525	$493,059						
Other	812,938	33,992						
Grayfish	198,088	1,981						
Hake	50,983	510						
Halibut	30,059	2,856						
Kingfish	18,177	454						
"Lingcod"	307,442	12,298						
Perch	225	9						
Rockfishes	532,401	17,037						
Sablefish	343,145	8,579						
Skates	221,324	4,426						
Tomcod	6,902	276						
Other fish	7,667	153						
Total	10,585,876	575,630						
SHELLFISH, ETC.								
Crabs	2,946	380			1,895,886	$229,703		
Shrimp			1,391,584	$20,874				
Octopus	1,051	63						
Total	3,997	443	1,391,584	20,874	1,895,886	229,703		
WHALE PRODUCTS								
Whale oil							3,844,209	$166,953
Grand total	10,589,873	576,073	1,391,584	20,874	1,895,886	229,703	3,844,209	166,953

Species	Tongs		Rakes and shovels		By hand	
	Pounds	Value	Pounds	Value	Pounds	Value
SHELLFISH, ETC.						
Clams:						
Cockle			21,534	$7,594		
Soft			37,303	9,474		
Mixed			246	70		
Mussels			3	1		
Oysters:						
Eastern, market	72,796	$29,118				
Native, market	4,949	3,093				
Terrapin					58	$7
Total	77,745	32,211	59,086	17,139	58	7

Fisheries of the Monterey district of California, 1930

OPERATING UNITS: By gear

Item	Purse seines, sardine	Lampara nets		Gill nets		Trammel nets	Lines	
		Sardine	Squid	Drift, sea bass	Other		Set and hand	Troll
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	51	459	114				14	14
On boats and shore		312	184	31	71	13	238	204
Total	51	771	298	31	71	13	252	218
Vessels, motor	5	37	20				5	7
Net tonnage	232	571	274				102	114
Boats:								
Motor		25	32	23	42	8	182	197
Other					16		30	
Apparatus:								
Number	5	62	52	23	61	8	1,954	1,214
Length, yards	2,050	20,756	10,220					
Square yards				45,322	83,390	12,480		
Hooks							140,631	4,977

Fisheries of the Monterey district of California, 1930—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Paranzella nets	Traps, octopus	Rakes	Shovels	Abalone outfits	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels					50	557
On boats and shore	6	15	1	8	10	632
Total	6	15	1	8	60	1, 189
Vessels, motor					10	52
Net tonnage					77	904
Boats:						
Motor	2	11			2	237
Other		1				35
Apparatus:						
Number	1	141	1	8	12	
Yards at mouth	17					

CATCH: BY GEAR

Species	Purse seines		Lampara nets		Gill nets		Trammel nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Anchovies			43, 500	$749				
Barracuda					30	$3		
Flounders:								
"California halibut"			237	28			13, 946	$1, 693
"Sole"			140	7			2, 338	117
Other							184	8
Horse mackerel			94, 901	1, 012	370	18		
Kingfish			24, 254	857	82, 566	2, 902		
"Lingcod"			25	1			448	24
Mackerel			113, 212	3, 279	1, 419	44		
Perch			6, 958	350	7, 740	332		
Pilchard or sardine	64, 290, 585	$307, 400	194, 789, 676	870, 040	17, 672	177		
Pompano			384	166	132	48		
Rockfishes			823	26			65	2
Sculpin							65	7
Sea bass, white or squeteague	191	23	625	65	44, 819	2, 977		
Skates			1, 853	34			4, 308	96
Smelt			60, 844	3, 443	278, 848	14, 643		
Tuna and tunalike fishes, bonito			508	25	658	33		
Whitebait			2, 996	261				
Total	64, 290, 776	307, 423	195, 140, 936	880, 343	434, 254	21, 177	21, 354	1, 947
SHELLFISH								
Crabs					1, 088	160		
Squid			10, 937, 974	115, 614				
Grand total	64, 290, 776	307, 423	206, 078, 910	995, 957	435, 342	21, 337	21, 354	1, 947

Fisheries of the Monterey district of California, 1930—Continued

CATCH: BY GEAR—Continued

Species	Lines				Paranzella nets		Traps	
	Set and hand		Troll					
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Flounders:								
"California halibut"	5,362	$542	1,529	$186	3,338	$350		
"Sole"	32,446	1,503	15	1	869,180	52,215		
Other	7,489	399			97,066	4,070		
Grayfish	280	3			8,645	86		
Hake					5,105	51		
Kingfish	8,257	289			9,530	238		
"Lingcod,"	154,597	8,416	3,370	186	37,914	1,523		
Mackerel	1,245,875	39,088	2,600	78				
Perch	129	7			130	5		
Rock bass	16	1						
Rockfishes	2,769,684	96,129	3,245	114	52,153	1,990		
Sablefish	243,116	7,754			24,473	612		
Salmon			279,409	31,528				
Sculpin	752	14						
Sea bass, white or squeteague	26	2	16	2				
Skates	4,517	91			18,193	349		
Smelt	271	19						
Tuna and tunalike fishes, albacore			172,962	12,570				
Other fish	7,838	357			4,893	171		
Total	4,480,655	154,614	463,146	44,665	1,130,620	61,660		
SHELLFISH								
Crabs					16	2		
Shrimp							8,736	$1,954
Octopus	8,974	904			117	11	53,912	5,154
Total	8,974	904			133	13	62,648	7,108
Grand total	4,489,629	155,518	463,146	44,665	1,130,753	61,673	62,648	7,108

Species	Rakes		Shovels		Abalone outfits	
	Pounds	Value	Pounds	Value	Pounds	Value
SHELLFISH						
Abalone					631,795	$126,359
Clams, Pismo			2,409	$1,230		
Mussels	30	$5				
Total	30	5	2,409	1,230	631,795	126,359

Fisheries of the San Pedro division of the southern district of California, 1930

OPERATING UNITS: BY GEAR

Item	Purse seines			Lampara nets		Haul seines	Gill nets		
	Barracuda	Sardine	Tuna	Sardine	Other		Drift, barracuda	Set, sea bass	Other
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	303	785	817	390	361		32	14	21
On boats and shore					50	2	74	69	41
Total	303	785	817	390	411	2	106	83	62
Vessels, motor	33	78	82	39	41		11	4	7
Net tonnage	938	2,991	3,328	893	506		69	42	49
Boats:									
Motor					11		26	30	15
Other						1	1	3	11
Apparatus:									
Number	33	78	82	39	52	1	38	37	37
Length, yards	14,228	31,747	46,625	17,106	21,152	100			
Square yards							330,904	152,625	30,905

Fisheries of the San Pedro division of the southern district of California, 1930—Con.

OPERATING UNITS: BY GEAR—Continued

Item	Trammel nets	Lines		Paranzella nets	Traps, lobster	Harpoons, swordfish	Shovels	Abalone outfits	Total, exclusive of duplication
		Set and hand	Troll						
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	37	119	731	10	19	21			2,025
On boats and shore	55	403	287	14	142	33	61	2	732
Total	92	522	1,018	24	161	54	61	2	2,757
Vessels, motor	13	40	110	3	8	5			254
Net tonnage	85	425	3,914	42	61	69			7,707
Boats:									
Motor	21	288	209	5	79	17		1	405
Other	1	18			13				41
Apparatus:									
Number	35	1,450	2,215	4	2,805	22	61	1	
Square yards	255,500								
Yards at mouth				67					
Hooks		255,987	2,215						

CATCH OFF CALIFORNIA: BY GEAR

Species	Purse seines		Lampara nets		Haul seines		Gill nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Anchovies			10,311	$284				
Barracuda	712,739	$76,627	607,348	29,831			637,740	$47,273
Carp					2,375	$175		
Eels			10	1				
Flounders:								
"California halibut"	186	22	430	60			407	51
"Sole"							52	2
Flyingfish	170	6	315	12			47,973	1,787
Grayfish	3,862	75	7,264	195			102,013	3,067
Halfmoon	2,920	247	13,894	756			19,951	1,717
Herring							259	13
Horse mackerel	38,353	1,434	234,518	8,651			48	2
Kingfish			276,951	5,293			741	14
"Lingcod"							20	1
Mackerel	72,776	775	10,497,248	108,489			107,081	2,191
Mullet			1,892	181			9,204	874
Perch	3,761	229	76,915	1,399			22,109	1,735
Pilchard or sardine	121,628,006	647,669	61,083,099	330,096			770	19
Pompano			1,275	716			14	8
Rock bass	10,085	1,053	26,051	1,660			2,193	90
Rockfishes	90	6	613	18			237	15
Sculpin							29	3
Sea bass:								
Black	9,915	527	5,453	320			4,405	233
White or squeteague	73,512	9,024	391,883	36,480			395,165	32,188
Sheepshead							1,007	36
Smelt	1,879	83	268,021	10,757			158,072	8,875
Tuna and tunalike fishes:								
Bluefin	15,036,617	859,132	405,172	22,708				
Bonito	2,416,196	78,599	121,256	2,799			56,121	1,089
Whitebait							55	4
Whitefish	30	2	105	9			253	14
Yellowtail	81,568	4,706	120,216	6,567			11,035	603
Other fish	87	4	940	61			1,006	22
Total	140,092,752	1,680,220	74,151,180	567,343	2,375	175	1,577,960	101,926
SHELLFISH								
Squid			30,316	1,665				
Grand total	140,092,752	1,680,220	74,181,496	569,008	2,375	175	1,577,960	101,926

Fisheries of the San Pedro division of the southern district of California, 1930—Con.

CATCH OFF CALIFORNIA: BY GEAR—Continued

Species	Trammel nets		Lines				Paranzella nets	
			Set and hand		Troll			
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Barracuda					597, 025	$32, 418	23	$2
Flounders:								
"California halibut"	321, 738	$45, 476	28, 577	$3, 692			379, 728	43, 831
"Sole"	4, 214	261	6, 401	456			368, 699	15, 605
Other	3, 413	259	13, 168	416			760	53
Grayfish	60, 884	2, 203	98, 395	2, 664	3, 214	62	12, 535	437
Horse mackerel			638	25				
Kingfish			12, 051	241				
"Lingcod"			2, 688	142			700	35
Mackerel			3, 543, 550	69, 847	252, 697	3, 544		
Perch			415	21				
Pompano			47	25	15	8		
Rock bass	578	39	148, 146	11, 791	4, 810	302	1, 049	83
Rockfishes	130	7	2, 040, 496	89, 031	28	2	1, 727	80
Sablefish			5, 506	405				
Salmon					6	1		
Sculpin	20	1	64, 186	6, 848			443	51
Sea bass:								
Black	1, 483	103	80, 488	4, 011	529	32	973	66
White or squeteague	2, 251	322	21, 883	2, 089	364	33	1, 627	270
Sheepshead	818	33	53, 573	1, 884			86	3
Skates	6, 841	163	8, 868	184			15, 701	315
Smelt			3, 303	152			134	7
Swordfish					28, 091	1, 687		
Tuna and tunalike fishes:								
Albacore					107, 987	10. 857		
Bluefin			764	74	793	62		
Bonito	153	2	1, 605	42	29, 311	612		
Skipjack or striped tuna					1, 109, 680	44, 387		
Yellowfin					12, 564	795		
Whitefish	197	14	112, 052	8, 449				
Yellowtail	243	13	310	20	28, 466	1, 589		
Other fish	376	15	31, 403	2, 228	178	8		
Total	403, 339	48, 911	6, 278, 513	204, 737	2, 175, 758	96, 399	784, 185	60, 838
SHELLFISH								
Sea crawfish or spiny lobster	7, 045	1, 399					340	74
Squid	60	7						
Total	7, 105	1, 406					340	74
Grand total	410, 444	50, 317	6, 278, 513	204, 737	2, 175, 758	96, 399	784, 525	60, 912

Species	Traps		Harpoons		Shovels		Abalone outfits	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Perch	1, 231	$60						
Rock bass	152, 724	9, 441						
Rockfishes	990	59						
Sculpin	889	106						
Sheepshead	148, 109	5, 514						
Swordfish			168, 334	$24, 922				
Whitefish	2, 662	142						
Total	306, 605	15, 322	168, 334	24; 922				
SHELLFISH								
Crabs	12	3						
Sea crawfish or spiny lobster	260, 285	51, 687						
Abalone							15, 521	$3, 972
Clams:								
Cockle					8, 510	$2, 063		
Pismo					19, 363	8, 380		
Octopus	258	46						
Total	260, 555	51, 736			27, 873	10, 443	15, 521	3, 972
Grand total	567, 160	67, 058	168, 334	24, 922	27, 873	10, 443	15, 521	3, 972

Fisheries of the San Pedro division of the southern district of California, 1930—Con.

CATCH OFF LATIN AMERICA: BY GEAR

Species	Purse seines		Lampara nets		Gill nets	
	Pounds	Value	Pounds	Value	Pounds	Value
Barracuda	860,009	$91,182			187	$28
Cabrilla	315	16				
Flounders, "California halibut"	218	21				
Mullet	80	6	474	$31		
Perch	660	30				
Rock bass	3,262	240				
Sea bass:						
Black	44,593	2,398			2,953	173
White or squeteague	60,241	8,146			26,606	2,540
Spanish mackerel	545	38				
Tuna and tunalike fishes:						
Bluefin	6,150,000	338,341				
Bonito	1,208,576	41,935				
Skipjack or striped tuna	38,051	1,599				
Yellowfin	1,184,340	79,496				
Whitefish	200	13			160	11
Yellowtail	2,049,967	85,565			384	20
Other fish	354	21				
Total	11,601,411	649,047	474	31	30,290	2,772

Species	Trammel nets		Lines			
			Set and hand		Troll	
	Pounds	Value	Pounds	Value	Pounds	Value
Barracuda					77,519	$5,164
Cabrilla			387,079	$22,529		
Flounders:						
"California halibut"	11,990	$1,160	354	53		
Other	100	7				
Grayfish			1,555	62		
Rock bass			10,710	582		
Sea bass:						
Black			23,516	1,242	90	5
White or squeteague			41,346	3,740		
Sheepshead			377	15		
Spanish mackerel			19,075	1,246		
Tuna and tunalike fishes:						
Bonito					5,991	188
Skipjack or striped tuna					5,699,289	202,279
Yellowfin					11,353,431	675,038
Yellowtail					364,323	26,244
Other fish			4,520	215		
Total	12,090	1,167	488,532	29,684	17,500,643	908,918

Fisheries of the San Diego division of the southern district of California, 1930

OPERATING UNITS: BY GEAR

Item	Lampara nets, sardine	Gill nets			Trammel nets
		Drift, barracuda	Set, sea bass	Other	
	Number	*Number*	*Number*	*Number*	*Number*
Fishermen:					
On vessels	80	10	14		15
On boats and shore	17	39	46	15	37
Total	97	49	60	15	52
Vessels, motor	14	3	4		4
Net tonnage	138	21	34		36
Boats:					
Motor	3	16	18	8	14
Other				1	
Apparatus:					
Number	17	19	22	11	18
Length, yards	4,790				
Square yards		94,804	120,450	6,826	247,572

Fisheries of the San Diego division of the southern district of California, 1930—Con.

OPERATING UNITS: BY GEAR—Continued

Item	Lines		Traps, lobster	Harpoons, swordfish and turtle	Total, exclusive of duplication
	Set and hand	Troll			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	214	770	43	75	841
On boats and shore	125	114	52	19	210
Total	339	884	95	94	1,051
Vessels, motor	47	102	10	16	117
Net tonnage	643	5,129	108	196	5,246
Boats:					
Motor	79	72	37	8	119
Other			2		3
Apparatus:					
Number	735	1,545	1,572	24	
Hooks	115,690	1,545			

CATCH OFF CALIFORNIA: BY GEAR

Species	Purse seines		Lampara nets		Gill nets		Trammel nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Anchovies			3,900	$39				
Barracuda					81,492	$6,799		
Flounders, "California halibut"							106,983	$11,628
Grayfish					63,175	308	33,711	151
Herring					43,579	565		
Kingfish			490	18				
Mackerel			239,355	2,887	19,220	392	271	8
Mullet			94	9	9,563	849		
Perch			2,934	82	443	16		
Pilchard or sardine			4,171,982	26,219				
Pompano			327	131				
Rock bass					334	11	348	9
Rockfishes							536	32
Sea bass:								
Black					2,250	108	1,557	88
White or squeteague			28	5	105,538	7,973	116	21
Skates							1,670	33
Smelt			6,127	271	7,800	468		
Tuna and tunalike fishes:								
Bluefin	130,448	$7,175	25,067	1,379				
Bonito			688	20	10,944	270		
Yellowtail							8,954	420
Total	130,448	7,175	4,450,992	31,060	344,338	17,759	154,146	12,390
SHELLFISH								
Sea crawfish or spiny lobster							2,194	295
Squid			679	34			433	52
Total			679	34			2,627	347
Grand total	130,448	7,175	4,451,671	31,094	344,338	17,759	156,773	12,737

NOTE.—The catch by purse seines was made entirely by fishermen from the San Pedro section.

Fisheries of the San Diego division of the southern district of California, 1930—Con.

CATCH OFF CALIFORNIA: BY GEAR—Continued

Species	Lines				Traps		Harpoons	
	Set and hand		Troll					
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Barracuda			877, 211	$56, 308				
Cabrilla	471	$17						
Flounders:								
"California halibut"	2, 482	201						
"Sole"	6, 498	583						
Other	43	3						
Grayfish	27, 747	123						
Kingfish	1, 981	61						
Mackerel	404, 154	10, 322	18, 280	231				
Pompano	29	11						
Rock bass	117, 321	5, 016	126	6	11, 891	$602		
Rockfishes	1, 052, 930	50, 407			138	6		
Sculpin	23, 043	1, 982						
Sea bass:								
Black	80, 345	3, 490	75	4				
White or squeteague	152, 464	10, 795	227	24				
Sheepshead	15, 962	572			21, 499	882		
Skates	85	1						
Swordfish			175	9			364, 895	$48, 723
Tuna and tunalike fishes:								
Albacore			2, 168	224				
Bluefin			31	2				
Bonito	40	1	1, 229, 016	38, 072				
Skipjack or striped tuna			1, 905, 595	76, 224				
Yellowfin			22, 989	1, 379				
Whitefish	99, 267	3, 836						
Yellowtail	59	3	964, 108	38, 646				
Total	1, 984, 921	87, 424	5, 020, 001	211, 129	33, 528	1, 490	364, 895	48, 723
SHELLFISH								
Sea crawfish or spiny lobster					104, 586	20, 779		
Grand total	1, 984, 921	87, 424	5, 020, 001	211, 129	138, 114	22, 269	364, 895	48, 723

CATCH OFF LATIN AMERICA: BY GEAR

Species	Purse seines		Gill nets		Trammel nets	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Barracuda	44, 761	$6, 732	18, 539	$1, 531		
Flounders, "California halibut"					189, 094	$19, 930
Sea bass:						
Black	1, 109	59	23, 887	1, 214	23, 433	1, 218
White or squeteague	2, 935	229	235, 115	21, 332	287	38
Smelt			1, 082	79		
Tuna and tunalike fishes:						
Bluefin	172, 296	9, 139				
Bonito	28, 511	1, 049				
Yellowfin	361, 494	22, 369				
Yellowtail	53, 560	2, 054	15, 083	730		
Total	664, 666	41, 631	293, 706	24, 886	212, 814	21, 186
SHELLFISH, ETC.						
Sea crawfish or spiny lobster					132	24
Grand total	664, 666	41, 631	293, 706	24, 886	212, 946	21, 210

NOTE.—The catch by purse seines was made entirely by fishermen from the San Pedro section.

Fisheries of the San Diego division of the southern district of California, 1930—Con.

CATCH OFF LATIN AMERICA: BY GEAR—Continued

Species	Lines				Traps		Harpoons	
	Set and hand		Troll					
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Barracuda			249,143	$25,224				
Cabrilla	121,674	$4,528						
Flounders, "California halibut"	42	6						
Mackerel	719	13	545	10				
Rock bass	17,804	1,474	715	17				
Rockfishes	8,405	429						
Sea bass:								
Black	86,448	4,562	507	25				
White or squeteague	20,461	2,625	146	19				
Sheepshead	2,258	96						
Spanish mackerel	23,345	757						
Swordfish							1,234	$154
Tuna and tunalike fishes:								
Bluefin	94	5						
Bonito			54,686	1,830				
Skipjack or striped tuna			11,732,972	465,347				
Yellowfin			43,719,363	2,617,140				
Whitefish	10,176	470						
Yellowtail	678	61	1,071,474	42,535				
Total	292,104	15,026	56,829,551	3,152,147			1,234	154
SHELLFISH, ETC.								
Sea crawfish or spiny lobster					1,019,557	$188,887		
Turtles							580	58
Grand total	292,104	15,026	56,829,551	3,152,147	1,019,557	188,887	1,814	212

Industries related to the fisheries of California, 1930

TRANSPORTING

Persons engaged on vessels	41
Vessels:	
Steam	1
Net tonnage	33
Motor	7
Net tonnage	539
Total vessels	8
Total net tonnage	572

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Northern district	San Francisco district	Monterey district	Southern district		Total
				San Pedro division	San Diego division	
Establishments	8	35	32	55	21	151
Persons engaged:						
Proprietors	5	47	41	93	27	213
Salaried employees	10	154	155	252	59	630
Wage earners—						
Average for season	119	685	2,201	3,163	1,518	7,686
Average for year	38	564	865	1,561	629	3,639
Paid to salaried employees	$21,173	$412,130	$398,786	$692,955	$172,846	$1,697,890
Paid to wage earners	40,199	859,041	880,068	1,789,121	779,796	4,348,225
Total, salaries and wages	61,372	1,271,171	1,278,854	2,482,076	952,642	6,046,115

Industries related to the fisheries of California—Continued

WHOLESALE AND MANUFACTURING—Continued

PRODUCTS MANUFACTURED

Item	Quantity	Value
Barracuda, fresh fillets ... pounds	225,000	$43,500
Cabrilla, fresh fillets ... do	115,000	20,250
Cod:		
Salted [1] ... do	2,870,327	150,928
Salted, packaged ... do	2,149,827	[2] 323,836
Flounders, fresh fillets ... do	4,735,000	947,000
Halibut, fresh fillets ... do	45,000	15,750
Mackerel, canned ... standard cases	127,479	430,962
Pilchard or sardine:		
Salted ... pounds	65,490	3,472
Canned ... standard cases	2,979,333	8,741,928
Meal ... tons	25,938	1,414,858
Oil ... gallons	5,803,166	1,826,319
Rockfishes, fresh fillets ... pounds	761,500	120,400
Salmon, mild-cured ... do	1,039,500	189,000
Sea bass, black, fresh fillets ... do	55,500	7,825
Sea bass, white, fresh fillets ... do	326,250	79,375
Totuava, fresh fillets ... do	260,000	52,000
Tuna and tunalike fishes:		
Salted (bonito) ... do	18,124	1,567
Canned [3] ... standard cases	2,010,640	13,055,876
Meal ... tons	8,554	428,556
Oil ... gallons	56,748	14,153
Spiny lobsters (fresh-cooked, whole) ... pounds	1,064,250	287,693
Shrimp:		
Sun-dried ... do	146,842	28,507
Meal ... tons	136	6,800
Squid, dried ... pounds	1,383,660	55,346
Abalone, fresh steaks ... do	583,589	248,025
Marine-shell novelties	(4)	95,000
Unclassified products:		
Packaged [5]	(4)	72,500
Salted [6] ... pounds	526,029	41,142
Smoked [7] ... do	450,098	124,131
Canned [8] ... standard cases	24,484	198,783
Meal [9] ... tons	3,712	237,672
Oil [10] ... gallons	579,083	187,720
By-products [11]	(4)	269,202
Total		29,720,076

[1] The cod were salted in Alaskan waters.

[2] This figure is included in the total, however, it should be explained that it represents a further manufacture of salted cod already included in this table.

[3] Includes canned albacore; bluefin, striped, and yellowfin tuna; bonito; and yellowtail.

[4] Data not available.

[5] Includes packaged fried fish cakes; and fresh-shucked western and eastern oysters.

[6] Includes salted anchovies, barracuda, cabrilla, herring, mackerel, mullet, salmon, black and white sea bass, Spanish mackerel, whitefish, and yellowtail; and mild-cured shad.

[7] Includes smoked mackerel, sablefish, salmon, and sardines.

[8] Includes canned salmon, shad, shad roe, abalone, squid, and fish cakes.

[9] Includes kelp, mackerel, and miscellaneous fish meal and fish flour.

[10] Includes sperm, whale, shark, shark-liver, mackerel, and miscellaneous fish oils.

[11] Includes agar agar; glue; miscellaneous dry scrap; alginates; and oyster-shell products.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State.

HALIBUT FISHERY OF THE PACIFIC COAST [11]

The halibut fishery of the Pacific coast, which is prosecuted both by United States (including Alaska) and Canadian vessels, ranks as one of the foremost fisheries of that section. During 1931 the total catch by vessels of both nationalities amounted to 42,845,000 pounds, valued at $2,842,000. This is a decrease of 13 per cent in quantity and 43 per cent in value as compared with the catch in 1930. Of the total catch in 1930, 83 per cent was taken by United States craft and 17 per cent by Canadian craft. Considered according to the ports of landing, 42 per cent was landed at Canadian ports, 36 per cent at ports in the State of Washington, and 22 per cent at ports in Alaska.

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[11] To preclude the possibility of unwarranted comparison of figures given in this section with others for years previous to 1927, it should be explained that the figures as herein compiled differ from those published in separate reports for the Alaska fisheries and the Pacific Coast States. The difference lies principally in the fleet classifications as between Washington and Alaska, though there is reason to believe that the figures on landings also are not comparable with those previously published, due to variable practice in the inclusion of United States caught halibut landed at foreign ports as well as the possible duplication of figures. The present compilation is a complete résumé of the landings of the United States fleet for the year 1931 at all Pacific ports, except those in Oregon and California, without omission or duplication. The fleet classification has been applied arbitrarily by including in the "Washington fleet" all vessels that land more than half of their catch in that State. All others were included in the "Alaska fleet." It has been necessary to use "hailing fares" for the weight of the landings at Prince Rupert, British Columbia. The data for Seattle and Alaska are based on the actual weight of the fares. Halibut are landed with the heads on, but eviscerated.

Halibut fishery of the Pacific coast, 1931

UNITED STATES OPERATING UNITS: BY FLEET CLASSIFICATION

Item	Washington fleet	Alaska fleet	Total
Regular halibut vessels:			
Number	94	123	217
Net tonnage	2, 448	2, 663	5, 111
Crew	651	768	1, 419
Dories	94	123	217
Skates of lines	2, 812	3, 532	6, 344
Vessels in other fisheries but landing one or more fares of halibut:			
Number	28	46	74
Net tonnage	593	508	1, 101
Crew	150	167	317
Dories	18	33	51
Skates of lines	769	995	1, 764
Regular halibut boats:			
Number	----------	17	17
Crew	----------	47	47
Skates of lines	----------	306	306
Boats in other fisheries but landing one or more fares of halibut:			
Number	----------	95	95
Crew	----------	150	150
Skates of lines	----------	636	636

CATCH OF ALL SPECIES: BY UNITED STATES VESSELS AND BOATS

Fleet classification	Landed in—						Total	
	Washington		British Columbia		Alaska			
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
WASHINGTON FLEET								
Regular vessels:								
Halibut	11, 402, 473	$827, 509	1, 823, 417	$116, 981	884, 414	$51, 724	14, 110, 304	$996, 214
Sablefish	1, 255, 446	43, 245	----------	--------	1, 145	35	1, 256, 591	43, 280
"Lingcod"	301, 399	8, 452	----------	--------	----------	-------	301, 399	8, 452
Rockfishes	254, 823	6, 367	----------	--------	----------	-------	254, 823	6, 367
Total	13, 214, 141	885, 573	1, 823, 417	116, 981	885, 559	51, 759	15, 923, 117	1, 054, 313
Other vessels:								
Halibut	823, 482	70, 903	31, 441	2, 605	12, 657	1, 131	867, 580	74, 639
Sablefish	17, 269	725	----------	--------	----------	-------	17, 269	725
"Lingcod"	89, 007	2, 475	----------	--------	----------	-------	89, 007	2, 475
Rockfishes	23, 869	763	----------	--------	----------	-------	23, 869	763
Total	953, 627	74, 866	31, 441	2, 605	12, 657	1, 131	997, 725	78, 602
ALASKA FLEET								
Regular vessels:								
Halibut	2, 962, 330	206, 007	8, 413, 476	567, 533	6, 773, 367	410, 620	18, 149, 173	1, 184, 160
Sablefish	22, 318	980	----------	--------	257, 416	7, 455	279, 734	8, 435
"Lingcod"	15, 285	1, 111	----------	--------	----------	-------	15, 285	1, 111
Rockfishes	9, 106	639	----------	--------	1, 522	57	10, 628	696
Total	3, 009, 039	208, 737	8, 413, 476	567, 533	7, 032, 305	418, 132	18, 454, 820	1, 194, 402
Other vessels and boats:								
Halibut	25, 606	2, 847	295, 174	20, 675	1, 955, 680	145, 005	2, 276, 460	168, 527
Sablefish	3, 680	184	----------	--------	7, 915	234	11, 595	418
"Lingcod"	838	42	----------	--------	1, 249	33	2, 087	75
Rockfishes	1, 293	65	----------	--------	8, 412	198	9, 705	263
Total	31, 417	3, 138	295, 174	20, 675	1, 973, 256	145, 470	2, 299, 847	169, 283

Halibut fishery of the Pacific coast, 1931—Continued

CATCH OF ALL SPECIES: BY UNITED STATES VESSELS AND BOATS—Continued

Fleet classification	Landed in—						Total	
	Washington		British Columbia		Alaska			
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
COMBINED FLEETS								
Regular vessels:								
Halibut	14, 364, 803	$1,033,516	10, 236, 893	$684, 514	7, 657, 781	$462, 344	32, 259, 477	$2,180,374
Sablefish	1, 277, 764	44, 225			258, 561	7, 490	1, 536, 325	51, 715
"Lingcod"	316, 684	9, 563					316, 684	9, 563
Rockfishes	263, 929	7, 006			1, 522	57	265, 451	7, 063
Total	16, 223, 180	1, 094, 310	10, 236, 893	684, 514	7, 917, 864	469, 891	34, 377, 937	2, 248, 715
Other vessels and boats:								
Halibut	849, 088	73, 750	326, 615	23, 280	1, 968, 337	146, 136	3, 144, 040	243, 166
Sablefish	20, 949	909			7, 915	234	28, 864	1, 143
"Lingcod"	89, 845	2, 517			1, 249	33	91, 094	2, 550
Rockfishes	25, 162	828			8, 412	198	33, 574	1, 026
Total	985, 044	78, 004	326, 615	23, 280	1, 985, 913	146, 601	3, 297, 572	247, 885
All vessels and boats:								
Halibut	15, 213, 891	1, 107, 266	10, 563, 508	707, 794	9, 626, 118	608, 480	35, 403, 517	2, 423, 540
Sablefish	1, 298, 713	45, 134			266, 476	7, 724	1, 565, 189	52, 858
"Lingcod"	406, 529	12, 080			1, 249	33	407, 778	12, 113
Rockfishes	289, 091	7, 834			9, 934	255	299, 025	8, 089
Grand total	17, 208, 224	1, 172, 314	10, 563, 508	707, 794	9, 903, 777	616, 492	37, 675, 509	2, 496, 600

NOTE.—These statistics are compiled from data collected by the International Fisheries Commission for Washington, by the U. S. Consular Service and the Prince Rupert Halibut Exchange for British Columbia, and by bureau agents for Alaska.

CATCH OF HALIBUT: BY UNITED STATES AND CANADIAN VESSELS AND BOATS

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Fleet classification	Landed in—						Total	
	Washington		British Columbia		Alaska			
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
WASHINGTON FLEET								
Regular halibut vessels	11, 403	$827	1, 823	$117	884	$52	14, 110	$996
Other vessels	823	71	32	3	13	1	868	75
Total	12, 226	898	1, 855	120	897	53	14, 978	1, 071
ALASKA FLEET								
Regular halibut vessels	2, 962	206	8, 413	568	6, 774	410	18, 149	1, 184
Other vessels and boats	26	3	295	20	1, 955	145	2, 276	168
Total	2, 988	209	8, 708	588	8, 729	555	20, 425	1, 352
COMBINED FLEETS								
Regular halibut vessels	14, 365	1, 033	10, 236	685	7, 658	462	32, 259	2, 180
Other vessels and boats	849	74	327	23	1, 968	146	3, 144	243
Total	15, 214	1, 107	10, 563	708	9, 626	608	35, 403	2, 423
British Columbia fleet	13	1	7, 429	[1] 418			7, 442	419
Grand total	15, 227	1, 108	17, 992	1, 126	9, 626	608	42, 845	2, 842

[1] Estimated.

NOTE.—These statistics are compiled from data collected by the International Fisheries Commission for Washington, by the U. S. Consular Service and the Prince Rupert Halibut Exchange for British Columbia, and by bureau agents for Alaska.

VESSEL FISHERIES AT SEATTLE, WASH.

During 1931, a total of 40,746,241 pounds of fishery products, valued at $2,308,024, were handled by Seattle wholesale dealers, exclusive of quantities received by transporting vessels or rail from Alaska or Canada. This represents an increase of 5 per cent in quantity and a decrease of 33 per cent in value as compared with the previous year.

Of the total quantity handled, 17,208,224 pounds, valued at $1,172,314, were landed by fishing vessels, an increase of 4 per cent in quantity and a decrease of 31 per cent in value as compared with the previous year. The vessels made 1,064 trips to the fishing grounds during the year, which is 170 trips less than during 1930. Halibut was the most important species taken by the fishing vessels, accounting for 88 per cent of the catch. Sablefish accounted for 8 per cent; and "lingcod" and rockfishes, each 2 per cent.

The catch by fishing vessels was taken off the Pacific coast from Oregon to Unalaska Island. South of Cape Spencer ranked as the most productive area, furnishing 56 per cent of the catch. Grounds west of Cape Spencer provided the balance.

During 1931, 23,538,017 pounds, valued at $1,135,710, were received by wholesale dealers from sources other than Alaska or Canada, or from vessels in the halibut fishery. Most of these products were taken in Puget Sound. This is an increase of 6 per cent in the quantity received from similar sources in 1930 and a decrease of 35 per cent in value. The increase in quantity was due to the large catch of humpback or pink salmon as compared with the "off year" for this species in 1930. All varieties of salmon accounted for 91 per cent of the fishery products handled by the wholesale dealers from sources other than the halibut fleet or from Alaska or Canada.

Fishery products landed by United States vessels at Seattle, Wash., 1931 [1]

BY BANKS

Fishing ground	Trips	Halibut				Sablefish	
		No. 1		No. 2			
		Pounds	Value	Pounds	Value	Pounds	Value
	Number						
West of Cape Spencer	268	4,037,226	$351,278	3,403,699	$171,878	18,304	$761
South of Cape Spencer	796	3,239,218	327,953	4,533,748	256,157	1,280,409	44,373
Total	1,064	7,276,444	679,231	7,937,447	428,035	1,298,713	45,134

Fishing ground	"Lingcod"		Rockfishes		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
West of Cape Spencer	30,473	$1,515	5,153	$213	7,494,819	$525,645
South of Cape Spencer	376,092	10,565	283,938	7,621	9,713,405	646,669
Total	406,529	12,080	289,091	7,834	17,208,224	1,172,314

[1] Halibut fleet.

Fishery products landed by United States vessels at Seattle, Wash., 1931 [1]—Cont'd

BY MONTHS

Month	Trips	Halibut				Sablefish	
		No. 1		No. 2			
		Pounds	Value	Pounds	Value	Pounds	Value
	Number						
January	7						
February	7	16,367	$2,067	3,203	$249	2,000	$180
March	67	496,298	61,549	230,526	21,481	15,403	770
April	113	750,892	81,339	547,779	42,433	12,886	543
May	135	671,357	64,207	919,432	55,997	8,779	370
June	155	908,779	88,249	1,227,896	59,762	65,500	2,796
July	123	1,070,574	89,631	1,128,656	49,304	143,477	4,123
August	144	1,337,109	96,822	1,340,616	52,139	207,156	5,705
September	138	1,024,353	81,311	1,260,298	56,470	310,558	10,127
October	106	653,760	67,842	912,450	59,927	316,736	11,119
November	57	346,955	46,214	366,591	30,273	180,718	7,685
December	12					35,500	1,716
Total	1,064	7,276,444	679,231	7,937,447	428,035	1,298,713	45,134

Month	"Lingcod"		Rockfishes		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
January	26,600	$1,603	10,500	$779	37,100	$2,382
February	17,150	1,355	8,950	726	47,670	4,577
March	31,255	1,556	4,347	230	777,829	85,586
April	104,250	2,425	33,186	804	1,448,993	127,544
May	58,527	1,137	28,672	642	1,686,767	122,353
June	35,691	718	43,264	943	2,281,130	152,468
July	10,499	209	17,819	365	2,371,025	143,632
August	15,251	302	53,642	1,071	2,953,774	156,039
September	15,446	343	39,555	928	2,650,210	149,179
October	28,479	685	29,300	733	1,940,725	140,306
November	19,681	742	356	13	914,301	84,927
December	43,700	1,005	19,500	600	98,700	3,321
Total	406,529	12,080	289,091	7,834	17,208,224	1,172,314

[1] Halibut fleet.

Fishery products received by Seattle wholesale dealers, 1931 [1]

BY MONTHS

Species	January		February		March		April		May	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Flounders:										
"Sole"	39,765	$1,388	43,221	$1,673	42,983	$1,242	49,022	$1,822	29,592	$805
Other			100	3	2,988	87	3,125	94	1,073	11
Halibut					3,020	453	3,060	248	7,547	609
Herring	875	18	2,217	34	1,050	10	750	4		
"Lingcod"	8,847	398	12,219	623	9,466	259	22,241	636	6,666	134
Perch	3,040	137	3,180	160	7,034	274	5,541	166	5,352	160
Rockfishes	5,625	208	7,561	350	5,183	244	5,832	169	7,639	198
Salmon:										
Blueback, red or sockeye									329	23
Chinook or king	96	19	299	57	23,892	3,931	281,610	37,477	1,452,151	122,379
Chum or keta	3,584	179							442	12
Silver or coho	68	5							21,661	1,102
Smelt	15,159	858	23,457	556	27,766	808	654	54	12,424	996
Steelhead trout	24,652	3,105	21,007	2,868	759	91			14,436	1,414
Sturgeon									699	35
Crabs	62,706	3,926	69,573	4,787	76,666	4,816	75,056	4,978	50,439	6,185
Octopus	535	28	2,863	143	7,348	221	7,375	221	7,362	219
Total	164,952	10,269	185,697	11,254	208,155	12,436	454,266	45,869	1,617,812	134,282

[1] This tabulation does not include fish received from Alaska or Canada, or vessels in the halibut fleet.

Fishery products received by Seattle wholesale dealers, 1931—Continued

BY MONTHS—Continued

Species	June		July		August		September	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Flounders:								
"Sole"	25, 439	$598	31, 932	$801	15, 278	$413	26, 580	$742
Other	4, 752	68	754	8	2, 497	35	526	5
Halibut	6, 274	521	6, 510	370	14, 719	281	1, 393	119
Herring	-	-	80	1	-	-	-	-
"Lingcod"	6, 447	128	9, 257	180	11, 027	198	3, 088	215
Perch	2, 190	109	2, 035	81	2, 067	82	2, 882	86
Rockfishes	15, 519	477	8, 371	230	4, 482	140	3, 100	77
Sablefish	34	1	-	-	-	-	-	-
Salmon:								
Blueback, red or sockeye	4, 127	288	13, 656	1, 205	26, 640	2, 443	1, 134	105
Chinook or king	2, 233, 946	210, 262	2, 664, 507	127, 301	1, 693, 110	142, 251	400, 087	28, 818
Chum or keta	2, 460	62	11, 945	179	80, 630	1, 209	167, 948	2, 516
Humpback or pink	4, 790	107	521, 095	8, 106	3, 388, 001	44, 893	768, 422	8, 504
Silver or coho	532, 070	29, 275	578, 830	29, 296	467, 407	24, 276	1, 739, 851	78, 359
Smelt	13, 117	656	29, 177	1, 114	12, 862	590	49, 379	1, 802
Steelhead trout	16, 114	804	14, 947	1, 195	1, 626	130	20, 496	888
Sturgeon	459	22	305	17	1, 842	97	327	16
Crabs	66, 616	4, 509	54, 648	4, 346	48, 818	3, 328	28, 842	1, 967
Octopus	4, 181	124	2, 785	84	1, 154	56	4, 961	242
Total	2, 938, 535	248, 011	3, 950, 834	174, 514	5, 772, 160	220, 422	3, 219, 016	124, 461

Species	October		November		December		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Flounders:								
"Sole"	22, 000	$588	27, 987	$669	35, 368	$940	389, 167	$11, 681
Other	7, 810	78	199	2	3, 080	31	26, 904	422
Halibut	1, 414	170	-	-	-	-	43, 937	2, 771
Herring	4, 715	94	2, 212	44	-	-	11, 899	205
"Lingcod"	3, 204	78	16, 469	492	42, 224	1, 611	151, 155	4, 952
Perch	6, 134	202	7, 699	323	6, 953	235	54, 107	2, 015
Rockfishes	4, 499	73	4, 445	194	13, 069	496	85, 325	2, 856
Sablefish	36, 186	1, 186	-	-	540	11	36, 760	1, 198
Salmon:								
Blueback, red or sockeye	-	-	-	-	-	-	45, 886	4, 064
Chinook or king	141, 143	9, 929	8, 721	687	409	29	8, 899, 971	683, 140
Chum or keta	2, 335, 295	35, 029	617, 555	13, 623	14, 160	212	3, 234, 019	53, 021
Humpback or pink	1, 145	14	-	-	-	-	4, 683, 453	61, 624
Silver or coho	937, 544	43, 926	129, 467	9, 017	44, 751	5, 350	4, 451, 649	220, 606
Smelt	45, 710	1, 868	22, 559	1, 241	16, 731	1, 198	268, 995	11, 741
Steelhead trout	2, 482	198	8, 087	647	11, 838	1, 411	136, 444	12, 751
Sturgeon	235	12	-	-	180	18	4, 047	217
Crabs	174, 310	8, 680	144, 128	7, 530	96, 142	5, 101	[2] 947, 944	60, 153
Octopus	9, 572	287	7, 769	255	10, 450	413	66, 355	2, 293
Total	3, 733, 398	102, 412	997, 297	34, 724	295, 895	17, 056	23, 538, 017	1, 135, 710

[2] 43,769 dozen.

LAKE FISHERIES [12]

The yield of the fisheries of the Great Lakes including the international lakes of northern Minnesota during 1930 amounted to 94,947,642 pounds, valued at $6,050,267. This is an increase of 11 per cent in quantity, but a decrease of 11 per cent in value as compared with the catch and its value for 1929. These fisheries gave employment to 6,980 fishermen or 3 per cent less than in 1929. Of the total number of fishermen employed, 1,666 regular fishermen were engaged on vessels, and 3,703 regular and 1,617 casual fishermen were employed in the shore and boat fisheries.

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[12] With reference to the figures published in this section the reader should refer to that section in the latter part of the book entitled "Statistical survey procedure" which gives in detail methods for collecting statistics, compilation practices, and conversion factors. This is most necessary for a complete understanding of the statistics presented herewith.

The statistics of the catch presented herewith were obtained largely from the records of the various State fishery agencies and from the Dominion Bureau of Statistics, Ottawa, Canada. The data for the operating units (fishermen, vessels, boats, and gear) of the United States were obtained largely by bureau agents in a special canvass; although State records in several instances were very helpful in this work.

In all cases the statistics collected are for the calendar year, except for Lake of the Woods, Rainy Lake, and Lake Namakan in Minnesota, which are for two seasons. For Lake of the Woods the seasons are from June 1 to Nov. 1 and Dec. 1 to Apr. 1, and for Rainy and Namakan Lakes from May 15 to Nov. 1 and Dec. 1 to Apr. 1. The catch for these two seasons, in the order named, have been combined to constitute a year. The quantity of fish taken in these lakes between Jan. 1 and Apr. 1 amounted to less than 3 per cent of the total catch of these lakes in 1927.

Lake fisheries of the United States and Canada, 1930

CATCH: BY LAKES

Species	Lake Ontario			Lake Erie		
	United States	Canada	Total	United States	Canada	Total
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Blue pike	30,753	25,000	55,753	11,792,338	5,899,100	17,691,438
Bowfin	817	(1)	817	2,576	(1)	2,576
Burbot	95,612	(1)	95,612	405,442	(1)	405,442
Carp	26,204	57,600	83,804	1,861,184	277,800	2,138,984
Catfish and bullheads	80,246	145,000	225,246	322,631	102,700	425,331
Chubs	-----	-----	-----	12,800	(1)	12,800
Cisco	-----	-----	-----	347,356	506,600	853,956
Eels	5,100	99,100	104,200	-----	100	100
Goldfish	-----	-----	-----	63,929	(1)	63,929
Lake herring	189,100	2,319,900	2,509,000	-----	-----	-----
Lake trout	24,082	363,700	387,782	5,083	11,100	16,183
Minnows	109	(1)	109	-----	-----	-----
Mooneye	-----	-----	-----	36,488	(1)	36,488
Pike (jacks)	8,625	133,100	141,725	8,183	41,600	49,783
Rock bass	705	(1)	705	2,208	(1)	2,208
Sauger pike	-----	-----	-----	1,530,770	(1)	1,530,770
Sheepshead	-----	-----	-----	2,883,581	(1)	2,883,581
Sturgeon	24,483	3,400	27,883	16,162	27,000	43,162
Sucker "mullet"	50,617	(1)	50,617	2,015,786	(1)	2,015,786
Sunfish	12,440	(1)	12,440	-----	-----	-----
White bass	78	(1)	78	483,696	(1)	483,696
Whitefish:						
Common	87,400	551,900	639,300	1,522,012	1,087,700	2,609,712
Menominee	-----	-----	-----	91	(1)	91
Yellow perch	29,943	135,100	165,043	4,340,117	3,419,700	7,759,817
Yellow pike	15,583	23,700	39,283	1,887,708	274,600	2,162,308
Miscellaneous	-----	243,400	243,400	-----	1,032,100	1,032,100
Total	681,897	4,100,900	4,782,797	29,540,141	12,680,100	42,220,241

Species	Lake Huron			Lake Michigan	Lake Superior		
	United States	Canada	Total	United States	United States	Canada	Total
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Blue pike	-----	-----	-----	-----	-----	700	700
Bowfin	16,007	(1)	16,007	-----	-----	-----	-----
Buffalofish	-----	-----	-----	400	-----	-----	-----
Burbot	6,879	(1)	6,879	115,236	3,399	(1)	3,399
Carp	897,014	4,900	901,914	491,237	999	100	1,099
Catfish and bullheads	134,978	300	135,278	77,968	1,109	(1)	1,109
Chubs	506,420	573,300	1,079,720	5,017,391	526,557	1,100	527,657
Lake herring	4,748,345	328,400	5,076,745	6,272,752	11,271,303	2,743,500	14,014,803
Lake trout	1,786,529	1,266,300	3,052,829	5,258,024	2,422,998	1,530,200	3,953,198
Pike (jacks)	67,250	2,100	69,350	86,446	12,800	9,900	22,700
Rock bass	13,200	(1)	13,200	788	-----	-----	-----
Sauger pike	198,254	(1)	198,254	23,938	4,064	(1)	4,064
Sheepshead	5,859	(1)	5,859	18,855	709	(1)	709
Smelt	-----	-----	-----	430	-----	-----	-----
Sturgeon	-----	8,100	8,100	-----	-----	2,700	2,700
Sucker "mullet"	2,676,949	(1)	2,676,949	1,770,917	86,291	(1)	86,291
Whitefish:							
Common	3,379,776	246,600	3,626,376	4,788,574	294,679	371,700	666,379
Menominee	109,236	(1)	109,236	221,477	41,331	(1)	41,331
Yellow perch	714,949	30,600	745,549	1,429,700	5,219	100	5,319
Yellow pike	1,114,999	153,200	1,268,199	63,376	22,885	66,600	89,485
Crawfish	-----	-----	-----	51,273	-----	-----	-----
Mussel shells	-----	-----	-----	5,284,475	-----	-----	-----
Miscellaneous	-----	396,200	396,200	-----	-----	34,100	34,100
Total	16,376,644	3,010,000	19,386,644	30,973,257	14,694,343	4,760,700	19,455,043

Lake fisheries of the United States and Canada, 1930—Continued

CATCH: BY LAKES—Continued

Species	Namakan Lake			Rainy Lake		
	United States	Canada	Total	United States	Canada	Total
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Chubs	57, 103	(1)	57, 103	41, 118	(1)	41, 118
Crappie	2, 968	(1)	2, 968			
Pike (jacks)	42, 786	1, 659	44, 445	70, 686	157, 687	228, 373
Sturgeon	254	1, 445	1, 699	885	626	1, 511
Sucker "mullet"	19, 229	(1)	19, 229	1, 182	(1)	1, 182
Tullibees	2, 000	1, 695	3, 695		113, 163	113, 163
Whitefish, common	31, 352	10, 596	41, 948	57, 402	32, 645	90, 047
Yellow perch	401	(1)	401	3, 059	9, 630	12, 689
Yellow pike	53, 029	16, 658	69, 687	76, 030	144, 804	220, 834
Miscellaneous					3, 929	3, 929
Total	209, 122	32, 053	241, 175	250, 362	462, 484	712, 846

Species	Lake of the Woods			Total all lakes		
	United States	Canada	Total	United States	Canada	Total
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Blue pike				11, 823, 091	5, 924, 800	17, 747, 891
Bowfin				19, 400	(1)	19, 400
Buffalofish	707	(1)	707	1, 107	(1)	1, 107
Burbot	15, 573	(1)	15, 573	642, 141	(1)	642, 141
Carp	16, 469	3, 134	19, 603	3, 293, 107	343, 534	3, 636, 641
Catfish and bullheads	23, 956	61, 183	85, 139	640, 888	309, 183	950, 071
Chubs				6, 161, 389	574, 400	6, 735, 789
Cisco				347, 356	506, 600	853, 956
Crappie	593	(1)	593	3, 561	(1)	3, 561
Eels				5, 100	99, 200	104, 300
Goldeye	55	(1)	55	55	(1)	55
Goldfish				63, 929	(1)	63, 929
Lake herring				22, 481, 500	5, 391, 800	27, 873, 300
Lake trout	310	23, 473	23, 783	9, 497, 026	3, 194, 773	12, 691, 799
Minnows				109	(1)	109
Mooneye				36, 488	(1)	36, 488
Pike (jacks)	227, 628	406, 870	634, 498	524, 404	752, 916	1, 277, 320
Rock bass				16, 901	(1)	16, 901
Sauger pike	73, 602	(1)	73, 602	1, 830, 628	(1)	1, 830, 628
Sheepshead				2, 909, 004	(1)	2, 909, 004
Smelt				430	(1)	430
Sturgeon	884	456	1, 340	42, 668	43, 727	86, 395
Sucker "mullet"	125, 102	(1)	125, 102	6, 746, 073	(1)	6, 746, 073
Sunfish				12, 440	(1)	12, 440
Tullibees	903, 023	102, 110	1, 005, 133	905, 023	216, 968	1, 121, 991
White bass				483, 774	(1)	483, 774
Whitefish:						
Common	11, 028	259, 187	270, 215	10, 172, 223	2, 560, 328	12, 732, 551
Menominee				372, 135	(1)	372, 135
Yellow perch	54, 721	2, 190	56, 911	6, 578, 109	3, 597, 320	10, 175, 429
Yellow pike	768, 225	541, 900	1, 310, 125	4, 001, 835	1, 221, 462	5, 223, 297
Crawfish				51, 273		51, 273
Mussel shells				5, 284, 475		5, 284, 475
Miscellaneous		138, 013	138, 013		1, 847, 742	1, 847, 742
Total	2, 221, 876	1, 538, 516	3, 760, 392	94, 947, 642	26, 584, 753	121, 532, 395

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[1] Where there has been a Canadian catch of these species it is included under "Miscellaneous."

Lake fisheries of the United States, 1930

OPERATING UNITS: By LAKES

Item	Lake Ontario	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	3	326	226	931	174	----	1,660
On boats and shore—							
Regular	81	915	766	903	959	79	3,703
Casual	93	266	126	987	145	----	1,617
Total	177	1,507	1,118	2,821	1,278	79	6,980
Vessels:							
Steam	----	29	17	53	8	----	107
Net tonnage	----	747	365	1,092	170	----	2,374
Motor	1	30	43	254	32	----	360
Net tonnage	11	292	457	2,681	285	----	3,726
Total vessels	1	59	60	307	40	----	467
Total net tonnage	11	1,039	822	3,773	455	----	6,100
Boats:							
Motor	67	279	362	793	560	154	2,215
Other	84	416	118	650	396	----	1,664
Apparatus:							
Haul seines	----	157	63	16	7	----	243
Length, yards	----	83,839	29,689	5,173	1,740	----	120,441
Gill nets—							
"Bull," 3 to 3½ inches	----	1,158	----	----	----	----	1,158
Square yards	----	339,778	----	----	----	----	339,778
"Shoal," 2¼ to 3¾ inches	774	10,836	2,306	14,706	7,201	----	35,823
Square yards	114,349	1,724,562	843,001	3,347,593	2,467,171	----	8,496,676
"Shoal," 4 to 6 inches	965	5,438	6,867	35,291	7,773	227	56,561
Square yards	193,500	1,135,496	2,545,679	10,489,683	3,885,655	78,963	18,328,976
Trammel nets	----	94	----	----	----	----	94
Square yards	----	9,882	----	----	----	----	9,882
Lines—							
Hand	----	50	5	4	20	----	79
Hooks	----	100	6	4	20	----	130
Troll	----	----	3	13	16	----	32
Hooks	----	----	14	21	32	----	67
Trot	50	181	144	242	614	----	1,231
Hooks	48,500	34,633	136,700	345,000	263,541	----	828,374
Pound nets	----	86	716	668	105	77	1,652
Trap nets	187	3,940	1,979	147	42	----	6,295
Fyke nets	154	1,183	378	507	25	268	2,515
Dip nets	----	23	----	4	----	----	27
Crawfish pots	----	----	----	5,418	----	----	5,418
Crowfoot bars (pairs)	----	----	----	285	----	----	285
Tongs	----	----	----	12	----	----	12
Forks	----	----	----	136	----	----	136
Picks	----	----	----	656	----	----	656

OPERATING UNITS: By STATES AND LAKES

Item	New York			Pennsylvania, Lake Erie	Ohio, Lake Erie
	Lake Ontario	Lake Erie	Total		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	3	85	88	118	123
On boats and shore—					
Regular	81	18	99	34	709
Casual	93	76	169	----	180
Total	177	179	356	152	1,012
Vessels:					
Steam	----	5	5	13	11
Net tonnage	----	101	101	329	317
Motor	1	11	12	8	11
Net tonnage	11	84	95	90	118
Total vessels	1	16	17	21	22
Total net tonnage	11	185	196	419	435

Lake fisheries of the United States, 1930—Continued

OPERATING UNITS: BY STATES AND LAKES—Continued

Item	New York			Pennsylvania, Lake Erie	Ohio, Lake Erie
	Lake Ontario	Lake Erie	Total		
	Number	*Number*	*Number*	*Number*	*Number*
Boats:					
Motor	67	18	85	12	210
Other	84	48	132	14	300
Apparatus:					
Haul seines	----------	16	16	----------	106
Length, yards	----------	1, 550	1, 550	----------	68, 452
Gill nets—					
"Bull," 3 to 3½ inches	----------	598	598	560	----------
Square yards	----------	137, 088	137, 088	202, 690	----------
"Shoal," 2¼ to 3¾ inches	774	1, 938	2, 712	4, 344	4, 554
Square yards	114, 349	280, 215	394, 564	736, 320	708, 027
"Shoal," 4 to 6 inches	965	1, 961	2, 926	3, 198	279
Square yards	193, 500	325, 407	518, 907	756, 448	53, 641
Trammel nets	----------	----------	----------	----------	94
Square yards	----------	----------	----------	----------	9, 882
Lines—					
Hand	----------	----------	----------	----------	50
Hooks	----------	----------	----------	----------	100
Trot	50	58	108	----------	123
Hooks	48, 500	9, 960	58, 460	----------	24, 673
Pound nets	----------	----------	----------	57	25
Trap nets	187	22	209	40	3, 842
Fyke nets	154	----------	154	----------	548
Dip nets	----------	----------	----------	----------	23

Item	Michigan					Indiana, Lake Michigan
	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Total	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels	----------	226	442	95	763	17
On boats and shore—						
Regular	154	766	481	259	1, 660	16
Casual	10	126	793	60	989	62
Total	164	1, 118	1, 716	414	3, 412	95
Vessels:						
Steam	----------	17	28	8	53	1
Net tonnage	----------	365	492	170	1, 027	26
Motor	----------	43	115	18	176	5
Net tonnage	----------	457	1, 100	121	1, 678	76
Total vessels	----------	60	143	26	229	6
Total net tonnage	----------	822	1, 592	291	2, 705	102
Boats:						
Motor	39	362	571	174	1, 146	40
Other	54	118	509	73	754	31
Apparatus:						
Haul seines	35	63	1	7	106	----------
Length, yards	13, 837	29, 689	333	1, 740	45, 599	----------
Gill nets—						
"Shoal," 2¼ to 3¾ inches	----------	2, 306	5, 519	2, 335	10, 160	387
Square yards	----------	843, 001	1, 238, 387	730, 911	2, 812, 299	99, 817
"Shoal," 4 to 6 inches	----------	6, 867	22, 842	4, 213	33, 922	536
Square yards	----------	2, 515, 679	6, 299, 030	2, 029, 280	10,873,989	150, 294
Lines—						
Hand	----------	5	4	20	29	----------
Hooks	----------	6	4	20	30	----------
Troll	----------	3	13	16	32	----------
Hooks	----------	14	21	32	67	----------
Trot	----------	144	75	333	552	----------
Hooks	----------	136, 700	117, 600	159, 041	413, 341	----------
Pound nets	4	716	482	59	1, 261	7
Trap nets	36	1, 979	147	42	2, 204	----------
Fyke nets	635	378	51	8	1, 072	----------
Dip nets	----------	----------	4	----------	4	----------
Crowfoot bars (pairs)	----------	----------	237	----------	237	30
Tongs	----------	----------	12	----------	12	----------
Forks	----------	----------	123	----------	123	----------
Picks	----------	----------	596	----------	596	60

Lake fisheries of the United States, 1930—Continued

OPERATING UNITS: BY STATES AND LAKES—Continued

Item	Illinois, Lake Michigan	Wisconsin			Minnesota		
		Lake Michigan	Lake Superior	Total	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:							
On vessels	38	434	77	511	2		2
On boats and shore—							
Regular	26	380	172	552	528	79	607
Casual		132	35	167	50		50
Total	64	946	284	1,230	580	79	659
Vessels:							
Steam	2	22		22			
Net tonnage	29	545		545			
Motor	8	126	13	139	1		1
Net tonnage	133	1,372	154	1,526	10		10
Total vessels	10	148	13	161	1		1
Total net tonnage	162	1,917	154	2,071	10		10
Boats:							
Motor	18	164	92	256	294	154	448
Other		110	40	150	283		283
Apparatus:							
Haul seines		15		15			
Length, yards		4,840		4,840			
Gill nets—							
"Shoal," 2¼ to 3¾ inches	1,193	7,607	1,238	8,845	3,628		3,628
Square yards	260,405	1,748,984	581,495	2,330,479	1,154,765		1,154,765
"Shoal," 4 to 6 inches	1,190	10,723	2,080	12,803	1,480	227	1,707
Square yards	376,775	3,663,584	1,269,540	4,933,124	586,835	78,963	665,798
Lines –							
Trot		167	47	214	234		234
Hooks		227,400	43,745	271,145	60,755		60,755
Pound nets	1	178	46	224		77	77
Fyke nets		456	17	473		268	268
Crawfish pots		5,418		5,418			
Crowfoot bars (pairs)		18		18			
Forks		13		13			

OPERATING UNITS OF LAKE ONTARIO:[1] BY GEAR

Item	Gill nets		Lines, trot	Trap nets	Fyke nets	Total, exclusive of duplication
	"Shoal," 2¼ to 3¾ inches	"Shoal," 4 to 6 inches				
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels	3					1
On boats and shore—						
Regular	22	16		47	20	81
Casual	49	18	30			93
Total	74	34	30	47	20	177
Vessels, motor:						
11 to 20 tons	1					1
Net tonnage	11					11
Boats:						
Motor	31	13		26	16	67
Other	17	10	29	26	16	84
Apparatus:						
Number	774	965	50	187	154	
Square yards	114,349	193,500				
Hooks			48,500			

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[1] Includes Niagara River below the Falls and the St. Lawrence River.

Lake fisheries of the United States, 1930—Continued

OPERATING UNITS OF LAKE ERIE:[2] BY GEAR

Item	Haul seines	Gill nets			Trammel nets
		"Bull," 3 to 3½ inches	"Shoal," 2¼ to 3¾ inches	"Shoal," 4 to 6 inches	
	Number	*Number*	*Number*	*Number*	*Number*
Fishermen:					
On vessels		130	315	226	
On boats and shore—					
Regular	312		28	6	
Casual	62		21	8	14
Total	374	130	364	240	14
Vessels:					
Steam—					
11 to 20 tons		2	8	5	
21 to 30 tons		8	13	11	
31 to 40 tons			4	3	
41 to 50 tons			2		
61 to 70 tons			1	1	
Total		10	28	20	
Net tonnage		222	715	499	
Motor—					
5 to 10 tons		12	19	17	
11 to 20 tons		1	9	3	
21 to 30 tons		1	1	1	
Total		14	29	21	
Net tonnage		131	283	195	
Total vessels		24	57	41	
Total net tonnage		353	998	694	
Boats:					
Motor	60		20	4	7
Other	149		12	4	
Apparatus:					
Number	157	1,158	10,836	5,438	94
Length, yards	83,839				
Square yards		339,778	1,724,562	1,135,496	9,882

Item	Lines		Pound nets	Trap nets	Fyke nets	Dip nets	Total, exclusive of duplication
	Hand	Trot					
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:							
On vessels							326
On boats and shore—							
Regular	8		36	487	141		915
Casual	50	125		1	2	23	266
Total	58	125	36	488	143	23	1,507
Vessels:							
Steam—							
11 to 20 tons							8
21 to 30 tons							13
31 to 40 tons							5
41 to 50 tons							2
61 to 70 tons							1
Total							29
Net tonnage							747
Motor—							
5 to 10 tons							20
11 to 20 tons							9
21 to 30 tons							1
Total							30
Net tonnage							292
Total vessels							59
Total net tonnage							1,039
Boats:							
Motor	2		13	166	40		279
Other	2	125	17	139	59		416
Apparatus:							
Number	50	181	86	3,940	1,183	23	
Hooks	100	34,633					

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[2] Includes Niagara River above the Falls.

Lake fisheries of the United States, 1930—Continued

OPERATING UNITS OF LAKE HURON: BY GEAR

Item	Haul seines	Gill nets		Lines			Pound nets	Trap nets	Fyke nets	Total, exclusive of duplication
		"Shoal," 2¼ to 3¾ inches	"Shoal," 4 to 6 inches	Hand	Troll	Trot				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	------	98	156	------	------	62	24	42	------	226
On boats and shore—										
Regular	73	84	172	------	------	15	264	339	49	766
Casual	67	40	38	5	3	2	------	5	2	126
Total	140	222	366	5	3	79	288	386	51	1,118
Vessels:										
Steam—										
5 to 10 tons	------	1	4	------	------	1	2	------	------	5
11 to 20 tons	------	1	5	------	------	2	------	------	------	5
21 to 30 tons	------	3	3	------	------	2	------	------	------	3
31 to 40 tons	------	2	2	------	------	1	------	------	------	2
51 to 60 tons	------	2	2	------	------	1	------	------	------	2
Total	------	9	16	------	------	7	2	------	------	17
Net tonnage	------	279	354	------	------	174	11	------	------	365
Motor—										
5 to 10 tons	------	7	13	------	------	1	4	12	------	28
11 to 20 tons	------	2	5	------	------	1	1	3	------	11
21 to 30 tons	------	2	3	------	------	1	1	------	------	3
31 to 40 tons	------	1	1	------	------	1	------	------	------	1
Total	------	12	22	------	------	4	6	15	------	43
Net tonnage	------	173	265	------	------	95	60	126	------	457
Total vessels	------	21	38	------	------	11	8	15	------	60
Total net tonnage	------	452	619	------	------	269	71	126	------	822
Boats:										
Motor	45	50	96	------	1	8	104	143	25	362
Other	33	28	18	2	2	1	7	42	5	118
Apparatus:										
Number	63	2,306	6,867	5	3	144	716	1,979	378	------
Length, yards	29,689	------	------	------	------	------	------	------	------	------
Square yards	------	843,001	2,545,679	------	------	------	------	------	------	------
Hooks	------	------	------	6	14	136,700	------	------	------	------

OPERATING UNITS OF LAKE MICHIGAN:[3] BY GEAR

Item	Haul seines	Gill nets		Lines			Pound nets	Trap nets
		"Shoal," 2¼ to 3¾ inches	"Shoal," 4 to 6 inches	Hand	Troll	Trot		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	10	509	819	------	------	206	109	14
On boats and shore—								
Regular	26	372	590	4	6	32	241	30
Casual	8	74	48	------	7	2	2	------
Total	44	955	1,457	4	13	240	352	44
Vessels:								
Steam—								
5 to 10 tons	------	1	5	------	------	3	------	------
11 to 20 tons	------	18	27	------	------	5	1	------
21 to 30 tons	------	5	6	------	------	5	------	------
31 to 40 tons	------	5	6	------	------	6	------	------
41 to 50 tons	------	1	1	------	------	1	------	------
51 to 60 tons	------	------	------	------	------	1	------	------
Total	------	30	45	------	------	21	1	------
Net tonnage	------	622	839	------	------	527	15	------

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[3] Includes operating units used in the mussel fisheries of streams tributary to Lakes Erie, Huron, and Michigan. Those used in Lakes Erie and Huron were inconsiderable and are included herein to avoid disclosure of private enterprise.

Lake fisheries of the United States, 1930—Continued

OPERATING UNITS OF LAKE MICHIGAN: BY GEAR—Continued

Item	Haul seines	Gill nets		Lines			Pound nets	Trap nets
		"Shoal," 2¼ to 3¾ inches	"Shoal," 4 to 6 inches	Hand	Troll	Trot		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Vessels—Continued								
Motor—								
5 to 10 tons	3	78	149			22	33	5
11 to 20 tons	1	40	61			15	6	1
21 to 30 tons		9	9			3		
31 to 40 tons		4	3				1	
Total	4	131	222			40	40	6
Net tonnage	29	1,456	2,247			453	317	47
Total vessels	4	161	267			61	41	6
Total net tonnage	29	2,078	3,086			980	332	47
Boats:								
Motor	3	185	251	1	12	18	152	23
Other	3	83	122	1	1		10	3
Apparatus:								
Number	16	14,706	35,291	4	13	242	668	147
Length, yards	5,173							
Square yards		3,317,593	10,489,683					
Hooks				4	21	345,000		

Item	Fyke nets	Dip nets	Craw-fish pots	Crow-foot bars	Tongs	Forks	Picks	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	44		2					931
On boats and shore—								
Regular	76		30	9		9		903
Casual	30	4	10	285	12	141	676	987
Total	150	4	42	294	12	150	676	2,821
Vessels:								
Steam—								
5 to 10 tons								7
11 to 20 tons								26
21 to 30 tons								9
31 to 40 tons								8
41 to 50 tons								2
51 to 60 tons								1
Total								53
Net tonnage								1,092
Motor—								
5 to 10 tons	15		1					160
11 to 20 tons	5							76
21 to 30 tons								13
31 to 40 tons								5
Total	20		1					254
Net tonnage	171		7					2,681
Total vessels	20		1					307
Total net tonnage	171		7					3,773
Boats:								
Motor	37		16	284		47	257	793
Other	25	2	23	10	12	103	419	650
Apparatus:								
Number	507	4	5,418	285	12	136	656	

Lake fisheries of the United States, 1930—Continued

OPERATING UNITS OF LAKE SUPERIOR: BY GEAR

Item	Haul seines	Gill nets		Lines			Pound nets	Trap nets	Fyke nets	Total, exclusive of duplication
		"Shoal" 2¼ to 3¾ inches	"Shoal" 4 to 6 inches	Hand	Troll	Trot				
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	------	117	107	------	------	73	6	------	------	174
On boats and shore—										
Regular	6	785	454	------	16	250	39	4	11	959
Casual	1	107	51	20	------	7	8	------	------	145
Total	7	1,009	612	20	16	330	53	4	11	1,278
Vessels:										
Steam—										
5 to 10 tons	------	1	1	------	------	1	------	------	------	1
11 to 20 tons	------	2	1	------	------	2	------	------	------	3
21 to 30 tons	------	2	3	------	------	1	------	------	------	3
41 to 50 tons	------	1	1	------	------	1	------	------	------	1
Total	------	6	6	------	------	5	------	------	------	8
Net tonnage	------	132	136	------	------	105	------	------	------	170
Motor—										
5 to 10 tons	------	17	23	------	------	12	3	------	------	27
11 to 20 tons	------	1	2	------	------	2	------	------	------	3
21 to 30 tons	------	1	------	------	------	------	------	------	------	1
31 to 40 tons	------	1	------	------	------	------	------	------	------	1
Total	------	20	25	------	------	14	3	------	------	32
Net tonnage	------	193	187	------	------	101	16	------	------	285
Total vessels	------	26	31	------	------	19	3	------	------	40
Total net tonnage	------	325	323	------	------	206	16	------	------	455
Boats:										
Motor	3	462	331	------	8	208	23	2	10	560
Other	5	352	79	20	------	8	9	------	------	396
Apparatus:										
Number	7	7,201	7,773	20	16	614	105	42	25	------
Length, yards	1,740	------	------	------	------	------	------	------	------	------
Square yards	------	2,467,171	3,885,655	------	------	------	------	------	------	------
Hooks	------	------	------	20	32	263,541	------	------	------	------

OPERATING UNITS OF LAKE OF THE WOODS, RAINY LAKE, AND NAMAKAN LAKE: BY GEAR

Item	Gill nets, "shoal" 4 to 6 inches	Pound nets	Fyke nets	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*
Fishermen on boats and shore—regular	63	21	27	79
Boats, motor	126	42	54	154
Apparatus:				
Number	227	77	268	----------
Square yards	78,963	----------	----------	----------

Lake fisheries of the United States, 1930—Continued

OPERATING UNITS:[4] BY STATES AND COUNTIES

Item	New York								
	Cayuga	Chautauqua	Erie	Jefferson	Monroe	Niagara	Orleans	Oswego	St. Lawrence
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		85		3					
On boats and shore—									
Regular		4	14	54	1	4		16	
Casual	1	41	23	9	25	20	4	14	18
Total	1	130	37	66	26	24	4	30	18
Vessels:									
Steam		5							
Net tonnage		101							
Motor		11		1					
Net tonnage		84		11					
Total vessels		16		1					
Total net tonnage		185		11					
Boats:									
Motor	1	4	14	34	7	5	3	7	
Other	1	21	15	32	10	15	1	15	18
Apparatus:									
Haul seines		16							
Length, yards		1, 550							
Gill nets—									
"Bull," 3 to 3½ inches		598							
Square yards		137, 088							
"Shoal," 2¼ to 3¾ inches	20	1, 829	109	168	66	15		214	
Square yards	2, 160	258, 665	21, 550	18, 588	21, 120	3, 762		26, 924	
"Shoal," 4 to 6 inches		1, 870	91	129	4	40	14	476	
Square yards		305, 124	20, 283	16, 400	1, 280	14, 300	3, 920	93, 440	
Lines—									
Trot		10	24	3		25	1	1	37
Hooks		2, 000	5, 560	750		3, 000	250	250	41, 600
Trap nets			22	187					
Fyke nets				147	7				

Item	New York—Continued		Pennsylvania	Ohio					
	Wayne	Total	Erie	Ashtabula	Cuyahoga	Erie	Lake	Lorain	Lucas
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		88	118	14	35	66		8	
On boats and shore—									
Regular	6	99	34	96	14	198	49	32	74
Casual	14	169		11	20	49	4	2	25
Total	20	356	152	121	69	313	53	42	99
Vessels:									
Steam		5	13	2	5	3		1	
Net tonnage		101	329	32	192	61		32	
Motor		12	8		1	10			
Net tonnage		95	90		9	109			
Total vessels		17	21	2	6	13		1	
Total net tonnage		196	419	32	201	170		32	
Boats:									
Motor	10	85	12	30	6	75	18	11	17
Other	4	132	14	38	7	78	18	11	50
Apparatus:									
Haul seines		16				12	1		16
Length, yards		1, 550				7, 898	45		4, 434

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[4] Exclusive of the operating units used in the mussel fisheries of streams tributary to the Great Lakes.

Lake fisheries of the United States, 1930—Continued

OPERATING UNITS: BY STATES AND COUNTIES—Continued

Item	New York—Continued		Pennsylvania	Ohio					
	Wayne	Total	Erie	Ashtabula	Cuyahoga	Erie	Lake	Lorain	Lucas
Apparatus—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Gill nets—									
"Bull," 3 to 3½ inches	--------	598	560	--------	--------	--------	------	--------	------
Square yards	--------	137, 088	202, 690	--------	--------	--------	------	--------	------
"Shoal," 2¼ to 3¾ inches	291	2, 712	4, 344	515	400	3, 110	1	368	------
Square yards	41, 795	394, 564	736, 320	85, 035	75, 504	481, 788	150	54, 000	------
"Shoal," 4 to 6 inches	302	2, 926	3, 198	--------	72	65	48	70	------
Square yards	64, 160	518, 907	756, 448	--------	19, 432	11, 895	8, 784	11, 530	------
Trammel nets	--------	--------	--------	--------	--------	94	------	--------	------
Square yards	--------	--------	--------	--------	--------	9, 882	------	--------	------
Lines—									
Trot	7	108	--------	14	2	43	5	3	43
Hooks	5, 050	58, 460	--------	3, 450	400	8, 860	325	120	8, 350
Pound nets	--------	--------	57	--------	3	--------	------	--------	22
Trap nets	--------	209	40	731	90	1, 562	369	183	197
Fyke nets	--------	154	--------	--------	--------	44	------	5	296
Dip nets	--------	--------	--------	--------	18	3	------	--------	------

Item	Ohio—Continued			Michigan					
	Ottawa	Sandusky	Total	Alcona	Alger	Allegan	Alpena	Antrim	Arenac
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	--------	--------	123	-------	27	4	55	-------	------
On boats and shore—									
Regular	246	--------	709	24	32	6	62	3	34
Casual	63	6	180	1	9	-------	5	3	20
Total	309	6	1, 012	25	68	10	122	6	54
Vessels:									
Steam	--------	--------	11	-------	3	-------	8	-------	------
Net tonnage	--------	--------	317	-------	44	-------	222	-------	------
Motor	--------	--------	11	-------	4	2	3	-------	------
Net tonnage	--------	--------	118	-------	27	11	19	-------	------
Total vessels	--------	--------	22	-------	7	2	11	-------	------
Total net tonnage	--------	--------	435	-------	71	11	241	-------	------
Boats:									
Motor	53	--------	210	10	16	3	34	1	23
Other	95	3	300	1	10	-------	4	4	6
Apparatus:									
Haul seines	74	3	106	-------	-------	1	--------	-------	17
Length, yards	55, 151	924	68, 452	-------	-------	333	--------	-------	7, 469
Gill nets—									
"Shoal," 2¼ to 3¾ inches	160	--------	4, 554	3	80	50	629	6	16
Square yards	11, 550	--------	708, 027	788	15, 040	8, 500	205, 925	900	4, 256
"Shoal," 4 to 6 inches	24	--------	279	-------	801	260	1, 369	12	------
Square yards	2, 000	--------	53, 641	-------	247, 300	43, 160	442, 675	1, 800	------
Trammel nets	--------	--------	94	-------	-------	-------	--------	-------	------
Square yards	--------	--------	9, 882	-------	-------	-------	--------	-------	------
Lines—									
Hand	50	--------	50	-------	5	-------	--------	-------	------
Hooks	100	--------	100	-------	5	-------	--------	-------	------
Troll	--------	--------	--------	-------	16	-------	--------	-------	------
Hooks	--------	--------	--------	-------	32	-------	--------	-------	------
Trot	13	--------	123	-------	101	-------	26	-------	------
Hooks	3, 168	--------	24, 673	-------	49, 000	-------	52, 000	-------	------
Pound nets	--------	--------	25	17	7	12	46	4	3
Trap nets	710	--------	3, 842	34	-------	-------	165	-------	50
Fyke nets	203	--------	548	-------	-------	-------	--------	-------	24
Dip nets	2	--------	23	-------	-------	-------	--------	-------	------

Lake fisheries of the United States, 1930—Continued

OPERATING UNITS: BY STATES AND COUNTIES—Continued

Item	Michigan—Continued								
	Baraga	Bay	Benzie	Berrien	Charlevoix	Cheboygan	Chippewa	Delta	Emmet
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels			25	24	69	36	10	56	7
On boats and shore—									
Regular	16	140	2	9	27	49	67	196	17
Casual	12	41		16	4	8	13	2	5
Total	28	181	27	49	100	93	90	254	29
Vessels:									
Steam			4	1	3	1	2		
Net tonnage			56	39	39	11	11		
Motor			4	4	19	13	2	19	2
Net tonnage			65	46	178	117	13	186	12
Total vessels			8	5	22	14	4	19	2
Total net tonnage			121	85	217	128	24	186	12
Boats:									
Motor	14	69	1	11	13	28	34	81	7
Other	14	57		2	2	5	17	50	7
Apparatus:									
Haul seines		34							
Length, yards		17, 380							
Gill nets—									
"Shoal," 2¼ to 3¾ inches	85	12	315	45	504	157	214	332	21
Square yards	25, 320	3, 192	103, 950	12, 585	151, 200	34, 375	37, 870	66, 475	3, 717
"Shoal," 4 to 6 inches	40	177	1, 074	762	5, 640	885	729	4, 516	290
Square yards	10, 415	50, 587	550, 740	252, 312	1, 507, 930	193, 950	396, 714	1, 449, 585	51, 330
Lines—									
Hand					1		5		
Hooks					1		5		
Trot		1	4	3	5	3	61	21	
Hooks		500	4, 500	8, 400	9, 000	1, 200	19, 600	27, 600	
Pound nets	11	66		2	23	66	74	150	24
Trap nets		584				473	71	83	21
Fyke nets	4	35					4	51	
Dip nets				4					

Item	Michigan—Continued								
	Gogebic	Grand Traverse	Houghton	Huron	Iosco	Keweenaw	Leelanau	Mackinac	Manistee
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels		9	38	18	21	5	51	79	22
On boats and shore—									
Regular	12	33	96	204	96	43	24	127	
Casual	6		18	27	1	2	7	11	4
Total	18	42	152	249	118	50	82	217	26
Vessels:									
Steam		1	2	2	1		6	1	
Net tonnage		9	34	57	15		94	8	
Motor		2	10	1	5	1	14	27	6
Net tonnage		17	61	10	68	10	99	228	46
Total vessels		3	12	3	6	1	20	28	6
Total net tonnage		26	95	67	83	10	193	236	46
Boats:									
Motor	9	22	78	87	32	28	16	62	1
Other	4	5	21	14	3	2	5	13	3
Apparatus:									
Haul seines	1		6	8	2				
Length, yards	90		1, 650	3, 108	852				

Lake fisheries of the United States, 1930—Continued

OPERATING UNITS: BY STATES AND COUNTIES—Continued

Item	Michigan—Continued								
	Gogebic	Grand Traverse	Houghton	Huron	Iosco	Keweenaw	Leelanau	Mackinac	Manistee
Apparatus—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Gill nets—									
"Shoal," 2¼ to 3¾ inches	33	436	1, 298	129	4	276	1, 231	957	131
Square yards	10, 571	69, 232	526, 455	58, 950	1, 064	69, 000	262, 249	261, 688	19, 953
"Shoal," 4 to 6 inches	15	240	2, 400	500	1, 539	351	2, 180	2, 491	826
Square yards	6, 660	72, 000	1, 335, 023	207, 575	613, 724	194, 580	516, 633	877, 610	146, 412
Lines—									
Hand	-------	1	10	2	-------	-------	-------	3	-------
Hooks	-------	1	10	2	-------	-------	-------	3	-------
Troll	-------	5	-------	1	-------	-------	8	-------	-------
Hooks	-------	5	-------	2	-------	-------	16	-------	-------
Trot	13	1	84	28	14	36	7	-------	8
Hooks	6, 500	400	38, 341	35, 200	19, 000	22, 600	4, 400	-------	10, 000
Pound nets	1	25	6	221	150	2	12	251	-------
Trap nets	-------	12	-------	483	1	-------	9	70	-------
Fyke nets	-------	-------	-------	190	-------	-------	-------	-------	-------

Item	Michigan—Continued								
	Marquette	Mason	Menominee	Monroe	Muskegon	Oceana	Ontonagon	Ottawa	Presque Isle
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	14	18	14	-------	17	7	11	32	27
On boats and shore—									
Regular	9	3	47	101	18	3	6	22	3
Casual	-------	-------	-------	6	6	-------	2	-------	6
Total	23	21	61	107	41	10	19	54	36
Vessels:									
Steam	1	-------	-------	-------	1	-------	2	6	-------
Net tonnage	41	-------	-------	-------	12	-------	51	96	-------
Motor	2	8	4	-------	5	2	1	1	6
Net tonnage	17	82	67	-------	45	27	6	7	112
Total vessels	3	8	4	-------	6	2	3	7	6
Total net tonnage	58	82	67	-------	57	27	57	103	112
Boats:									
Motor	6	2	22	26	11	1	4	12	6
Other	1	-------	4	31	3	1	4	-------	2
Apparatus:									
Haul seines	-------	-------	-------	23	-------	-------	-------	-------	-------
Length, yards	-------	-------	-------	9, 385	-------	-------	-------	-------	-------
Gill nets—									
"Shoal," 2¼ to 3¾ inches	127	-------	405	-------	78	4	240	1, 014	699
Square yards	14, 630	-------	60, 605	-------	10, 850	800	40, 495	214, 708	310, 356
"Shoal," 4 to 6 inches	190	702	966	-------	1, 391	172	210	1, 022	201
Square yards	56, 790	197, 100	235, 705	-------	226, 300	40, 160	86, 262	218, 508	89, 244
Lines—									
Trot	26	-------	-------	-------	6	-------	12	8	72
Hooks	16, 100	-------	-------	-------	12, 000	-------	6, 900	17, 600	28, 800
Pound nets	-------	6	22	-------	7	-------	3	15	-------
Trap nets	-------	-------	4	36	-------	-------	-------	-------	10
Fyke nets	-------	-------	-------	216	-------	-------	-------	-------	-------

Lake fisheries of the United States, 1930—Continued

OPERATING UNITS: BY STATES AND COUNTIES—Continued

Item	Michigan—Continued							
	Saginaw	Sanilac	Schoolcraft	St. Clair	Tuscola	Van Buren	Wayne	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	--------	--------	22	11	8	26	--------	763
On boats and shore—								
Regular	7	15	3	33	16	2	53	1,660
Casual	--------	--------	--------	4	--------	--------	4	243
Total	7	15	25	48	24	28	57	2,666
Vessels:								
Steam	--------	--------	2	2	--------	4	--------	53
Net tonnage	--------	--------	57	41	--------	90	--------	1,027
Motor	--------	--------	4	--------	2	3	--------	176
Net tonnage	--------	--------	67	--------	14	21	--------	1,678
Total vessels	--------	--------	6	2	2	7	--------	229
Total net tonnage	--------	--------	124	41	14	111	--------	2,705
Boats:								
Motor	1	6	1	12	8	1	13	812
Other	5	3	1	8	--------	--------	23	335
Apparatus:								
Haul seines	1	--------	--------	--------	1	--------	12	106
Length, yards	660	--------	--------	--------	220	--------	4,452	45,599
Gill nets—								
"Shoal," 2¼ to 3¾ inches	--------	14	130	167	60	258	--------	10,160
Square yards	--------	3,350	40,000	50,150	27,000	86,100	--------	2,812,299
"Shoal," 4 to 6 inches	--------	48	705	455	19	744	--------	33,922
Square yards	--------	5,130	240,575	144,400	6,300	158,800	--------	10,873,989
Lines—								
Hand	--------	--------	--------	2	--------	--------	--------	29
Hooks	--------	--------	--------	3	--------	--------	--------	30
Troll	--------	--------	--------	2	--------	--------	--------	32
Hooks	--------	--------	--------	12	--------	--------	--------	67
Trot	--------	--------	3	--------	--------	9	--------	552
Hooks	--------	--------	4,500	--------	--------	19,200	--------	413,341
Pound nets	--------	19	3	--------	9	--------	4	1,261
Trap nets	25	--------	9	26	38	--------	--------	2,204
Fyke nets	--------	--------	--------	110	19	--------	419	1,072
Dip nets	--------	--------	--------	--------	--------	--------	--------	4

Item	Indiana				Illinois			Wisconsin	
	Lake	Laporte	Porter	Total	Cook	Lake	Total	Ashland	Bayfield
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	3	14	-------	17	21	17	38	-------	75
On boats and shore—									
Regular	2	10	4	16	13	13	26	13	155
Casual	2	-------	-------	2	-------	-------	-------	3	26
Total	7	24	4	35	34	30	64	16	256
Vessels:									
Steam	-------	1	-------	1	1	1	2	-------	-------
Net tonnage	-------	26	-------	26	16	13	29	-------	-------
Motor	1	4	-------	5	5	3	8	-------	12
Net tonnage	12	64	-------	76	88	45	133	-------	148
Total vessels	1	5	-------	6	6	4	10	-------	12
Total net tonnage	12	90	-------	102	104	58	162	-------	148
Boats:									
Motor	2	6	2	10	5	13	18	11	77
Other	1	-------	-------	1	-------	-------	-------	5	29
Apparatus:									
Gill nets—									
"Shoal," 2¼ to 3¾ inches	31	338	18	387	553	640	1,193	10	1,188
Square yards	4,503	91,354	3,960	99,817	81,705	178,700	260,405	4,000	566,215
"Shoal," 4 to 6 inches	-------	536	-------	536	400	790	1,190	175	1,865
Square yards	-------	150,294	-------	150,294	75,480	301,295	376,775	54,095	1,198,257
Lines—									
Trot	-------	-------	-------	-------	-------	-------	-------	2	43
Hooks	-------	-------	-------	-------	-------	-------	-------	800	42,045
Pound nets	2	2	3	7	-------	1	1	-------	46
Fyke nets	-------	-------	-------	-------	-------	-------	-------	5	10

Lake fisheries of the United States, 1930—Continued

OPERATING UNITS—BY STATES AND COUNTIES—Continued

Item	Wisconsin—Continued								
	Brown	Door	Douglas	Kenosha	Kewaunee	Manitowoc	Marinette	Milwaukee	Oconto
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	52	130	2	21	21	33	37	72	37
On boats and shore—									
Regular	97	139	4	3	34	16	11	9	41
Casual	66	------	6	------	------	------	35	11	------
Total	215	269	12	24	55	49	83	92	78
Vessels:									
Steam	------	------	------	------	1	1	------	14	------
Net tonnage	------	------	------	------	19	18	------	309	------
Motor	22	50	1	7	6	8	15	2	15
Net tonnage	179	523	6	94	70	178	113	47	128
Total vessels	22	50	1	7	7	9	15	16	15
Total net tonnage	179	523	6	94	89	196	113	356	128
Boats:									
Motor	31	48	4	1	18	4	4	8	16
Other	53	10	6	1	1	2	21	4	5
Apparatus:									
Haul seines	15	------	------	------	------	------	------	------	------
Length, yards	4, 840	------	------	------	------	------	------	------	------
Gill nets—									
"Shoal," 2¼ to 3¾ inches	560	2, 897	40	402	291	626	775	646	965
Square yards	78, 750	854, 450	11, 280	126, 525	101, 640	162, 840	132, 076	96, 513	110, 850
"Shoal," 4 to 6 inches	470	5, 078	40	190	441	110	983	1, 291	1, 705
Square yards	77, 030	2, 210, 950	17, 188	86, 990	249, 580	39, 270	227, 866	445, 938	215, 420
Lines—									
Trot	------	82	2	9	21	4	------	23	------
Hooks	------	67, 900	900	17, 000	28, 700	4, 800	------	43, 200	------
Pound nets	33	68	------	------	------	30	13	4	1
Fyke nets	369	9	2	------	------	------	12	------	66
Crawfish pots	5, 418	------	------	------	------	------	------	------	------

Item	Wisconsin—Contd.			Minnesota					
	Ozaukee	Sheboygan	Total	Cook	Lake	Koochiching	St. Louis	Roseau and Lake of the Woods	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	23	8	511	------	------	------	2	------	2
On boats and shore—									
Regular	8	13	543	372	89	12	74	60	607
Casual	2	------	149	10	18	------	22	------	50
Total	33	21	1, 203	382	107	12	98	60	659
Vessels:									
Steam	4	2	22	------	------	------	------	------	------
Net tonnage	109	90	545	------	------	------	------	------	------
Motor	1	------	139	------	------	------	1	------	1
Net tonnage	40	------	1, 526	------	------	------	10	------	10
Total vessels	5	2	161	------	------	------	1	------	1
Total net tonnage	149	90	2, 071	------	------	------	10	------	10
Boats:									
Motor	6	11	239	205	44	24	59	116	448
Other	------	3	140	176	63	------	44	------	283
Apparatus:									
Haul seines	------	------	15	------	------	------	------	------	------
Length, yards	------	------	4, 840	------	------	------	------	------	------
Gill nets:—									
"Shoal," 2¼ to 3¾ inches	435	10	8, 845	2, 446	437	------	745	------	3, 628
Square yards	83, 340	2, 000	2, 330, 479	775, 865	155, 780	------	223, 120	------	1, 154, 765
"Shoal," 4 to 6 inches	365	90	12, 803	628	85	36	791	167	1, 707
Square yards	68, 740	41, 800	4, 933, 124	258, 515	39, 970	8, 400	293, 950	64, 963	665, 798
Lines—									
Trot	19	9	214	219	11	------	4	------	234
Hooks	52, 000	13, 800	271, 145	54, 005	4, 950	------	1, 800	------	60, 755
Pound nets	6	23	224	------	------	12	5	60	77
Fyke nets	------	------	473	------	------	------	------	268	268
Crawfish pots	------	------	5, 418	------	------	------	------	------	------

Lake fisheries of the United States, 1930—Continued

CATCH: BY GEAR

Species	New York							
	Haul seines		Gill nets		Trot lines		Trap nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike			591,786	$28,606			3,299	$469
Bowfin							667	22
Burbot			51,864	2,490			35,374	2,870
Carp	20,000	$1,200	20,721	852			4,611	253
Catfish and bullheads	2,000	200	2,130	232			43,570	4,708
Cisco			58,604	5,446				
Eels					4,800	$240		
Lake herring			176,170	14,214			12,930	746
Lake trout			19,955	3,164			7,971	1,015
Minnows	109	21						
Pike (jacks)			707	93			6,137	604
Rock bass			240	20			952	87
Sturgeon			7,925	2,194	29,560	7,270	770	211
Sucker "mullet"	110,000	7,000	16,679	843			47,378	1,637
Sunfish							8,072	369
White bass			398	33			404	30
Whitefish, common			193,284	39,863			63,255	8,265
Yellow perch			39,525	3,127			17,619	859
Yellow pike			2,217	342			24,048	4,085
Total	132,109	8,421	1,182,205	101,519	34,360	7,510	277,057	26,230

Species	New York—Continued				Pennsylvania			
	Fyke nets		Total		Gill nets		Pound nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike			595,085	$29,075	1,766,323	$70,654	417,420	$16,697
Bowfin	150	$8	817	30				
Burbot	16,739	1,069	103,977	6,429	1,101	22	155	3
Carp	1,928	96	47,260	2,401	124	5	1,579	63
Catfish and bullheads	35,772	3,578	83,472	8,718			3,471	174
Cisco			58,604	5,446	230,045	27,605	149	18
Eels	300	30	5,100	270				
Lake herring			189,100	14,960				
Lake trout			27,926	4,179	1,229	159		
Minnows			109	21				
Mooneye							115	2
Pike (jacks)	1,781	158	8,625	855				
Rock bass			1,192	107				
Sheepshead					468	19	15,043	602
Sturgeon			38,255	9,675	49	13	1,770	442
Sucker "mullet"	7,152	441	181,209	9,921	5,835	117	6,906	138
Sunfish	4,368	253	12,440	622				
White bass			802	63	423	21	36,844	1,844
Whitefish, common			256,539	48,128	647,043	129,408	107,900	21,580
Yellow perch	6,947	317	64,091	4,303	59,838	3,590	18,516	1,111
Yellow pike			26,265	4,427	249	24	13,423	1,300
Total	75,137	5,950	1,700,868	149,630	2,712,727	231,637	623,291	43,974

Species	Pennsylvania—Continued				Ohio			
	Trap nets		Total		Haul seines		Gill nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	27,665	$1,207	2,211,408	$88,558	5,327	$266	1,059,912	$52,996
Bowfin					1,042	10		
Burbot	5,750	115	7,006	140	418	8	25,341	506
Carp	840	34	2,543	102	953,950	38,158	10,921	437
Catfish and bullheads	5,500	275	8,971	449	62,710	3,136	287	14
Cisco			230,194	27,623	325	39	54,272	6,513
Goldfish					51,076	511	245	2
Lake trout			1,229	159				
Mooneye			115	2	21,328	213		
Sauger pike					12,541	627	501,090	25,055
Sheepshead	7,450	298	22,961	919	477,661	14,330	16,051	482
Sturgeon	354	89	2,173	544				
Sucker "mullet"	16,333	326	29,074	581	114,870	2,297	51,949	1,039
White bass	2,000	100	39,267	1,965	29,894	1,495	5,563	278
Whitefish, common			754,943	150,988			37,205	7,241
Yellow perch	7,100	426	85,454	5,127	5,063	202	1,536,858	61,474
Yellow pike	9,855	975	23,527	2,299	17,891	2,147	66,927	8,031
Total	82,847	3,845	3,418,865	279,456	1,754,096	63,439	3,366,621	164,068

Lake fisheries of the United States, 1930—Continued

CATCH: BY GEAR—Continued

Species	Ohio—Continued							
	Trammel nets		Lines				Pound nets	
			Hand		Trot			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike							31, 123	$1, 556
Burbot					73	$2	120	2
Carp	87, 648	$3, 506			3, 180	160	10, 615	425
Catfish and bullheads	670	33			16, 302	1, 600	3, 146	157
Mooneye							9, 001	90
Sauger pike			2, 356	$259				
Sheepshead	17, 034	511			3, 612	216	2, 694	81
Sucker, "mullet"	40	1					33, 137	663
White bass					35	2	4, 147	207
Whitefish, common							1, 821	364
Yellow perch			8, 643	951	307	30	639	25
Yellow pike	18	2	11, 117	2, 052	34	5	5, 454	654
Total	105, 410	4, 053	22, 116	3, 262	23, 543	2, 015	101, 897	4, 224

Species	Ohio—Continued							
	Trap nets		Fyke nets		Dip nets		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike	7, 919, 950	$395, 997	153	$8	133	$13	9, 016, 598	$450, 836
Bowfin			635	7			1, 677	17
Burbot	361, 768	7, 235	2, 201	44			389, 921	7, 797
Carp	111, 114	4, 445	63, 777	2, 551	2, 041	102	1, 243, 246	49, 784
Catfish and bullheads	136, 507	6, 825	34, 559	1, 728	112	11	254, 293	13, 504
Cisco	2, 614	314	7	1			57, 218	6, 867
Goldfish	8, 724	87	3, 884	39			63, 929	639
Mooneye	2, 555	26	3, 314	33			36, 198	362
Sauger pike	971, 386	48, 569	20, 380	1, 019	18	2	1, 507, 771	75, 531
Sheepshead	2, 026, 423	60, 693	256, 506	7, 695	53	4	2, 800, 034	84, 012
Sturgeon	217	65					217	65
Sucker, "mullet"	1, 258, 145	25, 163	243, 718	4, 874	214	10	1, 702, 073	34, 047
White bass	328, 822	16, 441	75, 244	3, 762			443, 705	22, 185
Whitefish, common	557, 640	112, 527					596, 666	120, 132
Yellow perch	2, 588, 456	103, 538	46, 908	1, 976	63	6	4, 186, 937	168, 202
Yellow pike	1, 424, 868	170, 984	288, 406	34, 609			1, 814, 715	218, 484
Total	17, 699, 189	952, 909	1, 039, 692	58, 346	2, 634	148	24, 115, 198	1, 252, 464

Species	Michigan							
	Haul seines		Gill nets		Lines			
					Hand		Troll	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bowfin	8, 921	$177					129	$2
Burbot	23	1	10, 673	$326	72	$3		
Carp	1, 067, 508	27, 751	9, 366	244			65	1
Catfish and bullheads	72, 754	5, 840	1, 312	79			66	6
Chubs	1, 010	101	1, 356, 828	137, 891			22	2
Lake herring	67, 777	1, 761	2, 500, 782	62, 520	106	3		
Lake trout	84	12	4, 298, 523	601, 793	9, 285	1, 301	40, 136	5, 619
Pike (jacks)	9, 648	965	12, 216	1, 221	145	15		
Rock bass	1, 881	56	141	4			84	3
Sauger pike	753	45	148, 203	8, 892			291	17
Sheepshead	20, 320	610	346	10				
Sucker "mullet"	592, 763	15, 260	313, 128	7, 832	220	4	22	1
Whitefish:								
Common	48	7	3, 067, 552	469, 335	2, 016	308	259	40
Menominee	904	54	250, 861	15, 052	58	3		
Yellow perch	34, 680	3, 225	201, 643	18, 752				
Yellow pike	156, 772	26, 024	146, 306	24, 287	913	152	778	129
Total	2, 035, 846	81, 889	12, 317, 880	1, 348, 238	12, 815	1, 789	41, 852	5, 820

Lake fisheries of the United States, 1930—Continued

CATCH: BY GEAR—Continued

Species	Michigan—Continued							
	Lines—Trot		Pound nets		Trap nets		Fyke nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bowfin	1, 065	$21	352	$7	3, 145	$63	3, 201	$63
Burbot	1, 058	43	4, 937	179	3, 111	120	1, 380	54
Carp	1, 642	45	31, 791	834	178, 127	4, 632	213, 347	5, 549
Catfish and bullheads	3, 006	230	6, 218	484	56, 873	4, 077	53, 162	2, 957
Chubs	7, 300	730	1, 077	107	12, 173	920	2, 980	298
Cisco			1, 270	33			70	2
Lake herring	4, 330	108	4, 896, 457	122, 411	144, 653	3, 616	17, 049	426
Lake trout	1, 075, 343	150, 548	267, 122	37, 397	106, 374	14, 892	16, 449	2, 303
Mooneye							175	2
Pike (jacks)	1, 207	121	10, 857	1, 086	47, 630	4, 764	25, 327	2, 532
Rock bass			216	6	6, 841	205	6, 546	197
Sauger pike			12, 238	735	62, 668	3, 760	25, 102	1, 506
Sheepshead			17, 472	523	6, 928	208	38, 413	1, 152
Sucker "mullet"	1, 227	28	562, 961	16, 149	1, 781, 491	47, 192	413, 520	10, 778
Whitefish:								
Common	18, 417	2, 818	3, 812, 491	583, 311	890, 929	136, 312	12, 780	1, 956
Menominee			52, 673	3, 161	1, 540	92	973	59
Yellow perch	4, 061	377	75, 872	7, 057	444, 223	41, 313	105, 011	9, 776
Yellow pike	1, 797	299	327, 149	54, 307	493, 343	81, 896	77, 053	12, 790
Total	1, 120, 453	155, 368	10, 081, 153	827, 787	4, 240, 049	344, 062	1, 012, 538	52, 400

Species	Michigan—Continued							
	Dip nets		Spears		Crowfoot bars		Tongs	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bowfin			93	$2				
Burbot	36	$1						
Carp	518	15						
Lake herring	150	4						
Pike (jacks)			310	31				
Smelt	430	4						
Sucker "mullet"	9, 039	181	229	11				
Yellow perch			182	17				
Mussel shells [5]					2, 783, 400	$79, 846	16, 000	$328
Pearls and slugs [5]						6, 444		35
Total	10, 173	205	814	61	2, 783, 400	86, 290	16, 000	363

Species	Michigan—Continued						Indiana—Gill nets	
	Forks		Picks		Total			
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bowfin					16, 906	$335		
Burbot					21, 290	727	15, 798	$934
Carp					1, 502, 364	39, 071		
Catfish and bullheads					193, 391	13, 673		
Chubs					1, 381, 390	140, 049	204, 211	16, 056
Cisco					1, 340	35		
Lake herring					7, 631, 304	190, 849	210, 139	10, 381
Lake trout					5, 813, 316	813, 865	185, 941	24, 908
Mooneye					175	2		
Pike (jacks)					107, 340	10, 735		
Rock bass					15, 709	471		
Sauger pike					249, 255	14, 955		
Sheepshead					83, 479	2, 503		
Smelt					430	4		
Sucker "mullet"					3, 674, 600	97, 436	273	13
Whitefish:								
Common					7, 804, 492	1, 194, 087	8, 565	1, 291
Menominee					307, 009	18, 421		
Yellow perch					865, 672	80, 517	10, 935	944
Yellow pike					1, 204, 111	199, 884		
Mussel shells [5]	306, 200	$6, 759	1, 600, 500	$47, 619	4, 706, 100	134, 552		
Pearls and slugs [5]		698		3, 668		10, 845		
Total	306, 200	7, 457	1, 600, 500	51, 287	35, 579, 673	2, 963, 016	635, 862	54, 527

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[5] From streams tributary to Lakes Michigan, Huron, and Erie. The mussels shells taken in streams tributary to Lakes Huron and Erie, which were inconsiderable, have been included with those taken in Lake Michigan, State of Michigan, to avoid disclosure of private enterprises.

Lake fisheries of the United States, 1930—Continued

CATCH: BY GEAR—Continued

Species	Indiana—Continued							
	Pound nets		Crowfoot bars		Picks		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Buffalofish	400	$28					400	$28
Burbot	175	10					15, 973	944
Carp	1, 512	72					1, 512	72
Chubs							204, 211	16, 056
Lake herring	44, 552	1, 012					254, 691	11, 393
Lake trout	510	75					186, 451	24, 983
Sucker "mullet"	650	23					923	36
Whitefish, common	2, 130	354					10, 695	1, 645
Yellow perch	1, 899	184					12, 834	1, 128
Mussel shells [5]			284, 000	$13, 900	188, 000	$9, 300	472, 000	23, 200
Pearls and slugs [5]				687		463		1, 150
Total	51, 828	1, 758	284, 000	14, 587	188, 000	9, 763	1, 159, 690	80, 635

Species	Illinois						Wisconsin—Haul seines	
	Gill nets		Pound nets		Total			
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Carp							239, 730	$7, 191
Catfish and bullheads							9, 569	575
Chubs	538, 192	$46, 637	2, 000	$180	540, 192	$46, 817		
Lake herring	65, 000	1, 400			65, 000	1, 400		
Lake trout	382, 442	42, 104	500	60	382, 942	42, 164		
Yellow perch	75, 500	6, 710	1, 000	100	76, 500	6, 810		
Total	1, 061, 134	96, 851	3, 500	340	1, 064, 634	97, 191	249, 299	7, 766

Species	Wisconsin—Continued					
	Gill nets		Lines, trot		Pound nets	
	Pounds	Value	Pounds	Value	Pounds	Value
Burbot	45, 366	$459			21, 518	$213
Carp	119, 865	3, 596				
Catfish and bullheads	9, 569	574				
Chubs	2, 624, 737	176, 226			832, 952	54, 213
Lake herring	2, 226, 129	40, 286			3, 630, 173	68, 242
Lake trout	1, 535, 606	141, 391	510, 724	$43, 500	744, 826	63, 483
Pike (jacks)	9, 028	903			38, 828	3, 883
Sheepshead	364	11			709	21
Sucker "mullet"	502, 053	20, 330			251, 027	10, 165
Whitefish:						
Common	429, 657	49, 399			143, 220	16, 467
Menominee	45, 906	5, 041			11, 666	1, 392
Yellow perch	409, 202	20, 460			204, 600	10, 230
Yellow pike	13, 454	622			7, 217	362
Total	7, 970, 936	459, 298	510, 724	43, 500	5, 886, 736	228, 671

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[5] From streams tributary to Lakes Michigan, Huron, and Erie. The mussel shells taken in streams tributary to Lakes Huron and Erie, which were inconsiderable, have been included with those taken in Lake Michigan, State of Michigan, to avoid disclosure of private enterprise.

Lake fisheries of the United States, 1930—Continued

CATCH: By gear—Continued

Species	Wisconsin—Continued							
	Fyke nets		Crawfish pots		Crowfoot bars		Forks	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Burbot	21,517	$212						
Carp	120,118	3,604						
Catfish and bullheads	57,667	3,460						
Chubs	479,418	33,900						
Lake herring	117,440	1,761						
Pike (jacks)	19,413	1,941						
Sheepshead	1,457	44						
Sucker "mullet"	251,026	10,165						
Whitefish, common	71,609	8,233						
Yellow perch	614,638	30,732						
Yellow pike	15,262	763						
Crawfish			51,273	$2,514				
Mussel shells [5]					70,918	$1,666	35,457	$832
Pearls and slugs [5]						277		137
Total	1,769,565	94,815	51,273	2,514	70,918	1,943	35,457	969

Species	Wisconsin—Total		Minnesota			
			Gill nets		Lines, trot	
	Pounds	Value	Pounds	Value	Pounds	Value
Burbot	88,401	$884	15,573	$195		
Carp	479,713	14,391				
Catfish and bullheads	76,805	4,609				
Chubs	3,937,107	264,339	41,386	1,072		
Lake herring	5,973,742	110,289	8,367,663	190,210		
Lake trout	2,791,156	248,374	196,108	27,450	97,898	$13,702
Pike (jacks)	67,269	6,727	227,470	12,896		
Sauger pike			49,068	2,709		
Sheepshead	2,530	76				
Sturgeon			652	195		
Sucker "mullet"	1,004,106	40,660	112,388	2,344		
Tullibee			604,016	15,080		
Whitefish.						
Common	644,486	74,099	98,888	9,323		
Menominee	57,572	6,433	7,554	579		
Yellow perch	1,228,440	61,422	2,441	122		
Yellow pike	35,933	1,747	470,152	46,155		
Crawfish	51,273	2,514				
Mussel shells [5]	106,375	2,498				
Pearls and slugs [5]		414				
Total	16,544,908	839,476	10,193,359	308,330	97,898	13,702

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[5] From streams tributary to Lakes Michigan, Huron, and Erie. The mussel shells taken in streams tributary to Lakes Huron and Erie, which were inconsiderable, have been included with those taken in Lake Michigan, State of Michigan, to avoid disclosure of private enterprise.

Lake fisheries of the United States, 1930—Continued

CATCH: BY GEAR—Continued

Species	Minnesota—Continued					
	Pound nets		Fyke nets		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Buffalofish	235	$4	472	$10	707	$14
Burbot	----------	----------	----------	----------	15, 573	195
Carp	5, 489	109	10, 980	220	16, 469	329
Catfish and bullheads	7, 985	678	15, 971	1, 358	23, 956	2, 036
Chubs	57, 103	1, 111	----------	----------	98, 489	2, 183
Crappie	3, 165	559	396	72	3, 561	631
Goldeye	----------	----------	55	2	55	2
Lake herring	----------	----------	----------	----------	8, 367, 663	190, 210
Lake trout	----------	----------	----------	----------	294, 006	41, 152
Pike (jacks)	63, 116	3, 156	50, 584	3, 288	341, 170	19, 340
Sauger pike	8, 178	451	16, 356	903	73, 602	4, 063
Sturgeon	977	293	394	118	2, 023	606
Sucker "mullet"	13, 900	278	27, 800	556	154, 088	3, 178
Tullibee	301, 007	7, 525	----------	----------	905, 023	22, 605
Whitefish:						
Common	5, 514	606	----------	----------	104, 402	9, 929
Menominee	----------	----------	----------	----------	7, 554	579
Yellow perch	19, 292	963	36, 448	1, 824	58, 181	2, 909
Yellow pike	171, 056	16, 675	256, 076	25, 608	897, 284	88, 438
Total	657, 017	32, 408	415, 532	33, 959	11, 363, 806	388, 399

CATCH: BY LAKES

Species	Lake Ontario—New York		Lake Erie					
			New York		Pennsylvania		Ohio	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike	30, 753	$3, 222	564, 332	$25, 853	2, 211, 408	$88, 558	9, 016, 598	$450, 836
Bowfin	817	30	----------	----------	----------	----------	1, 677	17
Burbot	95, 612	6, 144	8, 365	285	7, 006	140	389, 921	7, 797
Carp	26, 204	1, 145	21, 056	1, 256	2, 543	102	1, 243, 246	49, 784
Catfish and bullheads	80, 246	8, 429	3, 226	289	8, 971	449	254, 293	13, 504
Cisco	----------	----------	58, 604	5, 446	230, 194	27, 623	57, 218	6, 867
Eels	5, 100	270	----------	----------	----------	----------	----------	----------
Goldfish	----------	----------	----------	----------	----------	----------	63, 929	639
Lake herring	189, 100	14, 960	----------	----------	----------	----------	----------	----------
Lake trout	24, 082	3, 626	3, 844	553	1, 229	159	----------	----------
Minnows	109	21	----------	----------	----------	----------	----------	----------
Mooneye	----------	----------	----------	----------	115	2	36, 198	362
Pike (jacks)	8, 625	855	----------	----------	----------	----------	----------	----------
Rock bass	705	65	487	42	----------	----------	----------	----------
Sauger pike	----------	----------	----------	----------	----------	----------	1, 507, 771	75, 531
Sheepshead	----------	----------	----------	----------	22, 961	919	2, 800, 034	84, 012
Sturgeon	24, 483	6, 351	13, 772	3, 324	2, 173	544	217	65
Sucker "mullet"	50, 617	2, 061	130, 592	7, 860	29, 074	581	1, 702, 073	34, 047
Sunfish	12, 440	622	----------	----------	----------	----------	----------	----------
White bass	78	15	724	48	39, 267	1, 965	443, 705	22, 185
Whitefish, common	87, 400	12, 584	169, 139	35, 544	754, 943	150, 988	596, 666	120, 132
Yellow perch	29, 943	1, 943	34, 148	2, 360	85, 454	5, 127	4, 186, 937	168, 202
Yellow pike	15, 583	2, 846	10, 682	1, 581	23, 527	2, 299	1, 814, 715	218, 484
Total	681, 897	65, 189	1, 018, 971	84, 441	3, 418, 865	279, 456	24, 115, 198	1, 252, 446

Lake fisheries of the United States, 1930—Continued

CATCH: BY LAKES—Continued

Species	Lake Erie—Continued				Lake Huron—Michigan		Lake Michigan—Michigan	
	Michigan		Total					
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike			11, 792, 338	565, 247				
Bowfin	899	$18	2, 576	$35	16, 007	$317		
Burbot	150	6	405, 442	8, 228	6, 879	276	13, 193	$402
Carp	594, 339	15, 453	1, 861, 184	66, 595	897, 014	23, 322	10, 264	281
Catfish and bullheads	56, 141	3, 195	322, 631	17, 437	134, 978	10, 303	1, 418	99
Chubs	12, 800	1, 280	12, 800	1, 280	506, 420	50, 344	743, 526	76, 561
Cisco	1, 340	35	347, 356	39, 971				
Goldfish			63, 929	639				
Lake herring					4, 748, 345	118, 709	683, 963	17, 098
Lake trout	10	1	5, 083	713	1, 786, 529	250, 115	2, 372, 546	332, 155
Mooneye	175	2	36, 488	366				
Pike (jacks)	8, 183	818	8, 183	818	67, 250	6, 726	28, 205	2, 821
Rock bass	1, 721	52	2, 208	94	13, 200	396	788	23
Sauger pike	22, 999	1, 380	1, 530, 770	76, 911	198, 254	11, 894	23, 938	1, 437
Sheepshead	60, 586	1, 818	2, 883, 581	86, 749	5, 859	174	17, 034	511
Smelt							430	4
Sturgeon			16, 162	3, 933				
Sucker "mullet"	154, 047	5, 275	2, 015, 786	47, 763	2, 676, 949	72, 077	765, 888	18, 099
White bass			483, 696	24, 198				
Whitefish:								
Common	1, 264	193	1, 522, 012	306, 857	3, 379, 776	517, 105	4, 218, 851	645, 485
Menominee	91	5	91	5	109, 236	6, 554	186, 477	11, 189
Yellow perch	33, 578	3, 123	4, 340, 117	178, 812	714, 949	66, 499	112, 762	10, 487
Yellow pike	38, 784	6, 439	1, 887, 708	228, 803	1, 114, 999	185, 091	41, 666	6, 917
Mussel shells [5]							4, 706, 100	134, 552
Pearls and slugs [5]								10, 845
Total	987, 107	39, 093	29, 540, 141	1, 655, 454	16, 376, 644	1, 319, 902	13, 927, 049	1, 268, 966

Species	Lake Michigan—Continued							
	Indiana		Illinois		Wisconsin		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Buffalofish	400	$28					400	$28
Burbot	15, 973	944			86, 070	$849	115, 236	2, 195
Carp	1, 512	72			479, 461	14, 383	491, 237	14, 736
Catfish and bullheads					76, 550	4, 594	77, 968	4, 693
Chubs	204, 211	16, 056	540, 192	$46, 817	3, 529, 462	223, 575	5, 017, 391	363, 009
Lake herring	254, 691	11, 393	65, 000	1, 400	5, 269, 098	99, 719	6, 272, 752	129, 610
Lake trout	186, 451	24, 983	382, 942	42, 164	2, 316, 085	156, 615	5, 258, 024	585, 917
Pike (jacks)					58, 241	5, 824	86, 446	8, 645
Rock bass							788	23
Sauger pike							23, 938	1, 437
Sheepshead					1, 821	55	18, 855	566
Smelt							430	4
Sucker "mullet"	923	36			1, 004, 106	40, 660	1, 770, 917	58, 795
Whitefish:								
Common	10, 695	1, 645			559, 028	63, 844	4, 788, 574	710, 974
Menominee					35, 000	4, 176	221, 477	15, 365
Yellow perch	12, 834	1, 128	76, 500	6, 810	1, 227, 604	61, 380	1, 429, 700	79, 805
Yellow pike					21, 710	1, 086	63, 376	8, 003
Crawfish					51, 273	2, 514	51, 273	2, 514
Mussel shells [5]	472, 000	23, 200			106, 375	2, 498	5, 284, 475	160, 250
Pearls and slugs [5]		1, 150				414		12, 409
Total	1, 159, 690	80, 635	1, 064, 634	97, 191	14, 821, 884	712, 186	30,973,257	2, 158, 978

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[5] From streams tributary to Lakes Michigan, Huron, and Erie. The mussel shells taken in streams tributary to Lakes Huron and Erie, which were inconsiderable, have been included with those taken in Lake Michigan, State of Michigan, to avoid disclosure of private enterprise.

Lake fisheries of the United States, 1930—Continued

CATCH: BY LAKES—Continued

Species	Lake Superior					
	Michigan		Wisconsin		Minnesota	
	Pounds	Value	Pounds	Value	Pounds	Value
Burbot	1,068	$43	2,331	$35		
Carp	747	15	252	8		
Catfish and bullheads	854	76	255	15		
Chubs	118,644	11,864	407,645	40,764	268	$16
Lake herring	2,198,996	55,042	704,644	10,570	8,367,663	190,210
Lake trout	1,654,231	231,594	475,071	61,759	293,696	41,106
Pike (jacks)	3,702	370	9,028	903	70	6
Sauger pike	4,064	244				
Sheepshead			709	21		
Sucker "mullet"	77,716	1,985			8,575	267
Whitefish:						
Common	204,601	31,304	85,458	10,255	4,620	728
Menominee	11,205	673	22,572	2,257	7,554	579
Yellow perch	4,383	408	836	42		
Yellow pike	8,662	1,437	14,223	661		
Total	4,288,873	335,055	1,723,024	127,290	8,682,446	232,912

Species	Lake Superior—Total		Lake of the Woods, Rainy Lake, and Namakan Lake—Minnesota		Total, all lakes	
	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike					11,823,091	$568,469
Bowfin					19,400	382
Buffalofish			707	$14	1,107	42
Burbot	3,399	$78	15,573	195	642,141	17,116
Carp	999	23	16,469	329	3,293,107	106,150
Catfish and bullheads	1,109	91	23,956	2,036	640,888	42,989
Chubs	526,557	52,644	98,221	2,167	6,161,389	469,444
Cisco					347,356	39,971
Crappie			3,561	631	3,561	631
Eels					5,100	270
Goldeye			55	2	55	2
Goldfish					63,929	639
Lake herring	11,271,303	255,822			22,481,500	519,101
Lake trout	2,422,998	344,459	310	46	9,497,026	1,174,876
Minnows					109	21
Mooneye					36,488	366
Pike (jacks)	12,800	1,279	341,100	19,334	524,404	37,657
Rock bass					16,901	578
Sauger pike	4,064	244	73,602	4,063	1,830,628	94,549
Sheepshead	709	21			2,909,004	87,510
Smelt					430	4
Sturgeon			2,023	606	42,668	10,890
Sucker "mullet"	86,291	2,252	145,513	2,911	6,746,073	185,859
Sunfish					12,440	622
Tullibee			905,023	22,605	905,023	22,605
White bass					483,774	24,213
Whitefish:						
Common	294,679	42,287	99,782	9,201	10,172,223	1,599,008
Menominee	41,331	3,509			372,135	25,433
Yellow perch	5,219	450	58,181	2,909	6,578,109	330,418
Yellow pike	22,885	2,098	897,284	88,438	4,001,835	515,279
Crawfish					51,273	2,514
Mussel shells [5]					5,284,475	160,250
Pearls and slugs [5]						12,409
Total	14,694,343	695,257	2,681,360	155,487	94,947,642	6,050,267

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[5] From streams tributary to Lakes Michigan, Huron, and Erie. The mussel shells taken in streams tributary to Lakes Huron and Erie, which were inconsiderable, have been included with those taken in Lake Michigan, State of Michigan, to avoid disclosure of private enterprise.

Industries related to the fisheries of the Lake States, 1930

Item	New York	Pennsylvania	Ohio	Michigan	Indiana	Illinois	Wisconsin	Minnesota	Total
Transporting:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Persons engaged	----------	3	18	16	----------	----------	13	26	76
Vessels—									
Steam	----------	1	2	----------	----------	----------	1	2	6
Net tonnage	----------	17	41	----------	----------	----------	28	107	193
Motor	----------	----------	6	7	----------	----------	1	2	16
Net tonnage	----------	----------	66	95	----------	----------	19	69	249
Total vessels	----------	1	8	7	----------	----------	2	4	22
Total net tonnage	----------	17	107	95	----------	----------	47	176	442
Wholesale and manufacturing:									
Establishments	16	7	34	59	4	47	40	21	228
Persons engaged—									
Proprietors	21	14	56	75	4	66	49	21	306
Salaried employees	28	6	58	55	1	166	34	27	375
Wage earners:									
Average for season	67	57	199	246	5	366	250	140	1, 330
Average for year	65	57	191	209	5	327	145	103	1, 102
Salaries and wages paid	$144, 572	$93, 733	$486, 247	$442, 746	$11, 500	$1, 353, 091	$280, 256	$173, 843	$2, 985, 988
Manufactured products [1]	$98, 054	$74, 031	$268, 025	$270, 712	$20, 555	$631, 051	$298, 487	$102, 290	$1, 763, 205
Fishermen's prepared products:									
Persons engaged	8	3	5	162	3	20	153	212	566
Products	$356	$98	$5, 400	$81, 876	$2, 750	$43, 632	$44, 178	$78, 743	$257, 033

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[1] These production figures are not comparable with those shown in previous bulletins, since packaged fresh and frozen fishery products are now included.

NOTE.—Of the total number of persons employed on transporting craft, 21 have also been included as fishermen, and among the total persons engaged in the preparation of fishermen's manufactured products, 545 have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

Industries related to the lake fisheries of New York, 1930

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Chautauqua, Jefferson, and Oswego Counties	Erie County	Total
Establishments	5	11	16
Persons engaged:			
Proprietors	5	16	21
Salaried employees	7	21	28
Wage earners—			
Average for season	14	53	67
Average for year	14	51	65
Paid to salaried employees	$9,950	$59,301	$69,251
Paid to wage earners	13,250	62,071	75,321
Total salaries and wages	23,200	121,372	144,572

PRODUCTS MANUFACTURED

Item		Quantity	Value
Blue pike, fresh fillets	pounds	50,200	$12,332
Unclassified products:			
Smoked [1]	do	313,100	84,690
Miscellaneous [2]		(3)	1,032
Total			98,054

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 8]

Sturgeon roe, salted	pounds	330	$356

[1] Includes smoked eels, salmon, sturgeon, tullibee, and whitefish.
[2] Includes pickled herring, cisco caviar, salted cisco, and whitefish.
[3] Data not available.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 8 have also been included as fishermen. This fact should be considered in computing the total number of persons in the fishery industries exclusive of duplication.

Industries related to the lake fisheries of Pennsylvania, 1930

TRANSPORTING IN ERIE COUNTY

Persons engaged on vessels	3
Vessels, steam	1
Net tonnage	17

WHOLESALE AND MANUFACTURING IN ERIE COUNTY

OPERATING UNITS, SALARIES, AND WAGES

Establishments	7
Persons engaged:	
Proprietors	14
Salaried employees	6
Wage earners—	
Average for season	57
Average for year	57
Paid to salaried employees	$31,845
Paid to wage earners	61,888
Total salaries and wages	93,733

Industries related to the lake fisheries of Pennsylvania, 1930—Continued

WHOLESALE AND MANUFACTURING IN ERIE COUNTY—Continued

PRODUCTS MANUFACTURED

Item	Quantity	Value
Blue pike, frozen fillets ..... pounds	111, 250	$22, 250
Miscellaneous, fresh fillets [1] ..... do	251, 086	51, 781
Total	362, 336	74, 031

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 3]

Sturgeon roe, salted ..... pounds	78	$98

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[1] Includes fresh blue pike and yellow perch fillets.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons employed on transporting craft, 3 have also been included as fishermen, and among the total persons engaged in the preparation of fishermen's manufactured products, 3 have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

Industries related to the lake fisheries of Ohio, 1930

TRANSPORTING

Item	Erie County	Lake County	Lucas County	Ottawa County	Total
	Number	*Number*	*Number*	*Number*	*Number*
Persons engaged on vessels	10	3	2	3	18
Vessels:					
Steam—					
5 to 10 tons				1	1
30 to 40 tons		1			1
Total		1		1	2
Net tonnage		31		10	41
Motor—					
5 to 10 tons	3		1		4
11 to 20 tons	2				2
Total	5		1		6
Net tonnage	60		6		66
Total vessels	5	1	1	1	8
Total net tonnage	60	31	6	10	107

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Ashtabula and Lake Counties	Cuyahoga and Lorain Counties	Erie County	Lucas and Ottawa Counties	Total
Establishments	7	11	11	5	34
Persons engaged:					
Proprietors	8	17	23	8	56
Salaried employees	7	19	22	10	58
Wage earners—					
Average for season	25	87	70	17	199
Average for year	25	79	70	17	191
Paid to salaried employees	$20, 987	$64, 787	$89, 732	$42, 688	$218, 194
Paid to wage earners	32, 728	97, 152	113, 952	24, 221	268, 053
Total salaries and wages	53, 715	161, 939	203, 684	66, 909	486, 247

Industries related to the lake fisheries of Ohio, 1930—Continued

WHOLESALE AND MANUFACTURING—Continued

PRODUCTS MANUFACTURED

Item	Quantity	Value
Blue pike, fresh fillets……pounds..	302, 046	$60, 659
Salmon, smoked……do….	176, 250	67, 950
Sturgeon, smoked……do….	11, 646	7, 535
Tullibee, smoked……do….	281, 898	58, 580
Whitefish, smoked……do….	58, 741	17, 982
Yellow perch, fresh fillets……do….	132, 993	27, 369
Miscellaneous [1]……do….	111, 069	27, 950
Total	1, 074, 643	268, 025

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 5]

Item	Quantity	Value
Blue pike, fresh fillets……pounds..	19, 500	$3, 900
Yellow perch, fresh fillets……do….	5, 700	1, 500
Total	25, 200	5, 400

[1] Includes frozen fillets of blue pike, smoked cisco and sablefish.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons employed on transporting craft, 16 have also been included as fishermen, and among the total persons engaged in the preparation of fishermen's manufactured products, 4 have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

Industries related to the lake fisheries of Michigan, 1930

TRANSPORTING

Item	Cheboygan County	Mackinac County	Total
	Number	*Number*	*Number*
Persons engaged on vessels	14	2	16
Vessels, motor:			
5 to 10 tons	3		3
11 to 20 tons	1	1	2
21 to 30 tons	2		2
Total	6	1	7
Net tonnage	81	14	95

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Bay and Arenac Counties	Berrien and Ottawa Counties	Cheboygan and Alpena Counties	Charlevoix and Grand Traverse Counties	Huron County
Establishments	7	6	6	6	5
Persons engaged:					
Proprietors	12	8	5	3	7
Salaried employees	7		6	5	3
Wage earners—					
Average for season	26	26	12	8	21
Average for year	18	23	11	8	21
Paid to salaried employees	$20, 600	$10, 150	$9, 650	$9, 380	$9, 500
Paid to wage earners	21, 050	28, 900	9, 467	8, 050	23, 200
Total salaries and wages	41, 650	39, 050	19, 117	17, 430	32, 700

Industries related to the lake fisheries of Michigan, 1930—Continued

WHOLESALE AND MANUFACTURING—Continued

Operating Units, Salaries, and Wages—Continued

Item	Mackinac, Chippewa, Delta, and Schoolcraft Counties	Menominee, Houghton, and Marquette Counties	Newaygo, Mason, and Muskegon Counties	Wayne and St. Clair Counties	Total
Establishments	9	3	3	14	59
Persons engaged:					
Proprietors	9	3	4	24	75
Salaried employees	6	3	----------	25	55
Wage earners—					
Average for season	25	34	22	72	246
Average for year	21	24	22	61	209
Paid to salaried employees	$15,990	$11,900	$2,000	$118,800	$207,970
Paid to wage earners	23,870	24,440	22,700	73,099	234,776
Total salaries and wages	39,860	36,340	24,700	191,899	442,746

Products Manufactured

Item		Quantity	Value
Chubs, smoked	pounds	407,700	$106,660
Lake herring:			
Salted	do	2,423,040	81,730
Smoked	do	9,600	1,780
Lake trout, smoked	do	34,900	7,860
Whitefish, smoked	do	49,800	11,590
Fresh-water mussel button blanks	gross	156,740	28,122
Miscellaneous [1]		(2)	32,970
Total		----------	270,712

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 162]

Chubs, smoked	pounds	22,000	$6,500
Lake herring:			
Salted	do	1,034,466	29,857
Smoked	do	76,560	7,956
Lake trout:			
Salted	do	168,750	25,312
Smoked	do	8,200	2,275
Whitefish:			
Salted	do	100,000	7,000
Smoked	do	9,900	2,500
Caviar, fresh	do	950	476
Total		1,420,826	81,876

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[1] Includes smoked carp, Menominee, salmon, Russian sturgeon, and tullibee; and fresh fillets of lake trout and whitefish.

[2] Data not available.

Note.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons employed on transporting craft, 2 have also been included as fishermen, and among the total persons engaged in the preparation of fishermen's manufactured products 162 have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

Industries related to the lake fisheries of Indiana, 1930

WHOLESALE AND MANUFACTURING IN LA PORTE COUNTY

Operating Units, Salaries, and Wages

Establishments	4
Persons engaged:	
Proprietors	4
Salaried employees	1
Wage earners—	
Average for season	5
Average for year	5
Paid to salaried employees	$5,500
Paid to wage earners	6,000
Total salaries and wages	11,500

Products Manufactured

Item	Quantity	Value
Chubs, smoked ... pounds	74,600	$18,650
Miscellaneous [1]	(2)	1,905
Total		20,555

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 3]

Chubs, smoked ... pounds	7,500	$1,875
Lake trout, smoked ... do	2,500	625
Whitefish, smoked ... do	1,000	250
Total	11,000	2,750

[1] Includes smoked lake trout and fish oil.

[2] Data not available.

Note.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 3 have also been included as fishermen. This fact should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

Industries related to the lake fisheries of Illinois, 1930

WHOLESALE AND MANUFACTURING IN COOK COUNTY

Operating Units, Salaries, and Wages

Establishments	47
Persons engaged:	
Proprietors	66
Salaried employees	166
Wage earners—	
Average for season	366
Average for year	327
Paid to salaried employees	$750,880
Paid to wage earners	602,211
Total salaries and wages	1,353,091

Industries related to the lake fisheries of Illinois, 1930—Continued

WHOLESALE AND MANUFACTURING IN COOK COUNTY—Continued

PRODUCTS MANUFACTURED

Item	Quantity	Value
Chubs, smoked ... pounds	772, 600	$189, 056
Eels, smoked ... do	20, 334	6, 810
Lake trout, smoked ... do	23, 390	5, 654
Salmon, smoked ... do	610, 330	221, 100
Tullibee, smoked ... do	437, 800	86, 856
Miscellaneous [1] ... do	602, 366	121, 575
Total	2, 466, 820	631, 051

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 20]

Item	Quantity	Value
Chubs, smoked ... pounds	131, 300	$34, 997
Eels, smoked ... do	400	180
Lake herring, smoked ... do	20, 000	2, 000
Lake trout, smoked ... do	15, 000	4, 500
Sturgeon, smoked ... do	2, 650	1, 430
Whitefish, smoked ... do	1, 500	525
Total	170, 850	43, 632

[1] Includes smoked buffalofish, butterfish, carp, ciscoes, lake herring, flounders, sea herring, sturgeon, and shad; and pickled sea herring.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State.

Industries related to the lake fisheries of Wisconsin, 1930

TRANSPORTING

Item	Bayfield County	Menominee County	Total
	Number	*Number*	*Number*
Persons engaged on vessels	10	3	13
Vessels:			
Motor		1	1
Net tonnage		19	19
Steam	1		1
Net tonnage	28		28
Total	1	1	2
Net tonnage	28	19	47

WHOLESALE AND MANUFACTURING

OPERATING UNITS, SALARIES, AND WAGES

Item	Bayfield and Ashland Counties	Brown County	Douglas County	Manitowoc and Waupaca Counties	Marinette County	Milwaukee County	Ozaukee and Kenosha Counties	Total
Establishments	4	7	4	3	3	15	4	40
Persons engaged:								
Proprietors	3	9	4	3	3	18	9	49
Salaried employees	4	12		2		14	2	34
Wage earners—								
Average for season	55	67	8	25	17	48	30	250
Average for year	14	36	7	9	10	43	26	145
Paid to salaried employees	$8, 650	$26, 621	$3, 900	$1, 050		$34, 200	$42, 708	$117, 129
Paid to wage earners	15, 840	45, 328	5, 000	8, 855	$10, 754	54, 250	23, 100	163, 127
Total salaries and wages	24, 490	71, 949	8, 900	9, 905	10, 754	88, 450	65, 808	280, 256

Industries related to the lake fisheries of Wisconsin, 1930—Continued

WHOLESALE AND MANUFACTURING—Continued

PRODUCTS MANUFACTURED

Item		Quantity	Value
Chubs, smoked	pounds	528, 472	$102, 991
Lake herring:			
Salted	do	922, 000	28, 413
Spiced	do	95, 000	13, 350
Smoked	do	302, 280	26, 934
Lake trout, smoked	do	198, 281	42, 978
Salmon, smoked	do	85, 760	14, 937
Tullibee, smoked	do	78, 235	15, 272
Whitefish, smoked	do	81, 449	16, 640
Miscellaneous [1]		(2)	36, 972
Total			298, 487

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 153]

Chubs, smoked	pounds	20, 000	$4, 400
Lake herring, salted	do	1, 444, 497	39, 228
Lake trout, smoked	do	2, 500	550
Total		1, 466, 997	44, 178

[1] Includes pickled lake herring and lake trout; salted lake trout and whitefish; fresh fillets of blue pike, jack pike, sauger, and yellow perch; canned whitefish caviar; poultry feed and lime from mussel shells; and novelties and button blanks from fresh-water mussel shells.

[2] Data not available.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 153 have also been included as fishermen. This fact should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

Industries related to the lake fisheries of Minnesota, 1930

TRANSPORTING

Item	Roseau County	St. Louis County	Total
	Number	*Number*	*Number*
Persons engaged on vessels	6	20	26
Vessels:			
Steam—			
31 to 40 tons		1	1
71 to 80 tons		1	1
Total		2	2
Net tonnage		107	107
Motor—			
5 to 10 tons	1		1
61 to 70 tons	1		1
Total	2		2
Net tonnage	69		69
Total vessels	2	2	4
Total net tonnage	69	107	176

Industries related to the lake fisheries of Minnesota, 1930—Continued

WHOLESALE AND MANUFACTURING

Operating Units, Salaries, and Wages

Item	Cook, Lake, Lake of the Woods, Koochiching and Roseau Counties	St. Louis County	Total
Establishments	7	14	21
Persons engaged:			
Proprietors	6	15	21
Salaried employees	6	21	27
Wage earners—			
Average for season	33	107	140
Average for year	15	88	103
Paid to salaried employees	$9, 760	$48, 760	$58, 520
Paid to wage earners	17, 672	97, 651	115, 323
Total salaries and wages	27, 432	146, 411	173, 843

Products Manufactured

Item	Quantity	Value
Tullibee, smoked ... pounds	59, 000	$6, 000
Unclassified products:		
Salted [1] ... do	448, 200	44, 038
Smoked [2] ... do	171, 400	52, 252
Total	678, 600	102, 290

FISHERMEN'S MANUFACTURED PRODUCTS

[Number of persons engaged, 212]

Lake herring:		
Salted ... pounds	2, 195, 500	$65, 873
Smoked ... do	102, 000	10, 200
Lake trout, smoked ... do	8, 500	2, 550
Whitefish, smoked ... do	1, 200	120
Total	2, 307, 200	78, 743

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[1] Includes salted Alaska herring, alewives, lake herring, mackerel, salmon, lake trout, and sablefish.

[2] Includes smoked ciscoes, lake herring, salmon fillets, and lake herring fillets.

NOTE.—Some of the above products may have been manufactured from fishery products imported from another State or country; therefore, they can not be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 212 have also been included as fishermen. This fact should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

Mussel-shell industry of the lake fisheries, 1930 [1]

OPERATING UNITS

Item	Lake Michigan						
	St. Joseph River			Grand River	Kalamazoo River	Muskegon River	Elkhart River
	Michigan	Indiana	Total	Michigan	Michigan	Michigan	Indiana
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen—On boats and shore, casual	250	30	280	306	50	140	12
Boats:							
Motor	80	10	90	164	20	70	12
Other	170	20	190	149	30	70	
Apparatus:							
Crowfoot bars	80	10	90	137	20		12
Tongs				12			
Forks				98	25		
Picks	230	30	260	176	50	140	12

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[1] The mussel-shell industry of streams tributary to Lakes Huron and Erie, which was inconsiderable, has been included with the St. Joseph River tributary to Lake Michigan, State of Michigan to avoid disclosure of private enterprise.

Mussel-shell industry of the lake fisheries, 1930—Continued

OPERATING UNITS—Continued

Item	Lake Michigan—Continued						
	Pigeon River	Fox River	Grand River	Total, all rivers			Grand total
	Indiana	Wisconsin	Wisconsin	Michigan	Indiana	Wisconsin	
Fishermen—On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular		4	5			9	9
Casual	18	12	6	746	60	18	824
Total	18	16	11	746	60	27	833
Boats:							
Motor	8	12	5	334	30	17	381
Other	10	4	6	419	30	10	459
Apparatus:							
Crowfoot bars	8	12	6	237	30	18	285
Tongs				12			12
Forks		8	5	123		13	136
Picks	18			596	60		656

CATCH

Gear and product	Lake Michigan							
	St. Joseph River						Grand River, Mich.	
	Michigan		Indiana		Total			
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
By crowfoot bars:								
Mussel shells	612,000	$31,518	180,000	$9,750	792,000	$41,268	1,947,400	$40,208
Pearls and slugs		1,500		450		1,950		4,480
By tongs:								
Mussel shells							16,000	328
Pearls and slugs								35
By forks:								
Mussel shells							278,200	5,744
Pearls and slugs								640
By picks:								
Mussel shells	401,000	21,502	120,000	6,500	521,000	28,002	679,500	14,032
Pearls and slugs		1,000		300		1,300		1,280
Total	1,013,000	55,520	300,000	17,000	1,313,000	72,520	2,921,100	66,747

Gear and product	Lake Michigan—Continued							
	Kalamazoo River, Mich.		Muskegon River, Mich.		Elkhart River, Ind.		Pigeon River, Ind.	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Vaule
By crowfoot bars:								
Mussel shells	224,000	$8,120			54,000	$2,025	50,000	$2,125
Pearls and slugs		464				112		125
By forks:								
Mussel shells	28,000	1,015						
Pearls and slugs		58						
By picks:								
Mussel shells	28,000	1,015	492,000	$11,070	18,000	675	50,000	2,125
Pearls and slugs		58		1,330		38		125
Total	280,000	10,730	492,000	12,400	72,000	2,850	100,000	4,500

Mussel-shell industry of the lake fisheries, 1930—Continued

CATCH—Continued

Gear and product	Lake Michigan—Continued					
	Fox River, Wis.		Grand River, Wis.		Total, all rivers—Michigan	
	Pounds	Value	Pounds	Value	Pounds	Value
By crowfoot bars:						
Mussel shells	36,784	$1,143	34,134	$523	2,783,400	$79,864
Pearls and slugs		190		87		6,444
By tongs:						
Mussel shells					16,000	328
Pearls and slugs						35
By forks:						
Mussel shells	18,391	571	17,066	261	306,200	6,759
Pearls and slugs		95		42		698
By picks:						
Mussel shells					1,600,500	47,619
Pearls and slugs						3,668
Total	55,175	1,999	51,200	913	4,706,100	145,397

Gear and product	Lake Michigan—Continued					
	Total, all rivers—Continued				Grand total	
	Indiana		Wisconsin			
	Pounds	Value	Pounds	Value	Pounds	Value
By crowfoot bars:						
Mussel shells	284,000	$13,900	70,918	$1,666	3,138,318	$95,412
Pearls and slugs		687		277		7,408
By tongs:						
Mussel shells					16,000	328
Pearls and slugs						35
By forks:						
Mussel shells			35,457	832	341,657	7,591
Pearls and slugs				137		835
By picks:						
Mussel shells	188,000	9,300			1,788,500	56,919
Pearls and slugs		463				4,131
Total	472,000	24,350	106,375	2,912	5,284,475	172,659

BUTTON BLANK MANUFACTURING

Item	Number	Value
Establishments	4	
Persons engaged:		
Proprietors	4	
Salaried employees	1	
Wage earners—		
Average for season	50	
Average for year	35	
Paid to salaried employees		$2,150
Paid to wage earners		32,455
Total salaries and wages		34,605
Products—Button blanks, gross	176,740	36,812
By-products—Miscellaneous		424

FISHERIES OF THE MISSISSIPPI RIVER AND TRIBUTARIES

Catch of the fisheries of the Mississippi River and tributaries, 1922

Species	Pounds	Value
Black bass	73, 554	$10, 874
Bowfin	190, 073	6, 078
Buffalofish	17, 267, 177	1, 013, 692
Carp	18, 338, 371	872, 128
Catfish and bullheads	8, 092, 690	713, 461
Crappie	512, 423	49, 338
Drum, fresh-water, or sheepshead	5, 260, 892	290, 480
Eels	16, 060	1, 057
Mooneye	3, 450	166
Paddlefish or spoonbill cat	1, 398, 991	132, 545
Paddlefish caviar	12, 398	29, 546
Pike and pickerel	20, 100	1, 850
Pike perch (sauger)	4, 745	768
Pike perch (wall-eyed)	24, 650	3, 750
Quillback or "American carp"	765, 389	59, 221
Rock bass	2, 738	312
Sturgeon, lake	10, 953	1, 369
Sturgeon, shovelnose	227, 365	19, 323
Sturgeon, shovelnose, caviar	1, 880	2, 615
Sturgeon, shovelnose, eggs	449	764
Sucker "mullet"	699, 539	63, 028
Sunfish	374, 533	24, 955
White bass	64, 624	5, 500
Yellow bass	7, 500	600
Yellow perch	22, 250	1, 904
Other fish	73, 275	4, 917
Shrimp	147, 482	14, 570
Crawfish	7, 890	759
Frogs	231, 761	20, 410
Turtles	96, 743	2, 772
Alligator hides	15, 616	2, 673
Mussel shells	51, 768, 173	1, 050, 592
Pearls		46, 124
Slugs		55, 380
Total	105, 733, 734	4, 503, 521

FISHERIES OF ALASKA[13]

During 1931 the fisheries of Alaska employed 22,577 persons, of whom 8,914 were fishermen, 11,995 were engaged in the wholesale and manufacturing industries, and 1,668 in transporting fishery products. The catch in round weight amounted to 598,124,566 pounds, valued at $10,043,366, consisting of 467,664,391 pounds of salmon, valued at $7,757,966; 128,290,715 pounds of other fish, valued at $2,164,986; and 2,169,460 pounds of shellfish, valued at $120,414.

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[13] With reference to the figures published in this section the reader should refer to that section in the latter part of the book entitled "Statistical survey procedure," which gives in detail methods for collecting statistics, compilation practices, and conversion factors. This is most necessary for a complete understanding of the statistics presented herewith.

Fisheries of Alaska, 1931

SUMMARY: BY DISTRICTS

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
In fishing ... number	4, 183	1, 973	2, 758	8, 914
In transporting ... do	591	584	493	1, 668
In wholesale and manufacturing industries ... number	4, 599	3, 396	4, 000	11, 995
Total	9, 373	5, 953	7, 251	22, 577
CRAFT EMPLOYED				
Vessels fishing ... number	525	48	9	582
Boats fishing ... do	2, 138	1, 433	1, 389	4, 960
Vessels transporting ... do	172	140	87	399
Scows, houseboats, pile drivers, etc ... do	334	312	190	836
Total	3, 169	1, 933	1, 675	6, 777
CATCH				
Fish:				
Salmon ... pounds	204, 452, 280	137, 905, 111	125, 307, 000	467, 664, 391
value	$2, 879, 412	$2, 219, 945	$2, 658, 609	$7, 757, 966
Other ... pounds	104, 835, 823	17, 390, 925	6, 063, 967	128, 290, 715
value	$1, 924, 822	$187, 840	$52, 324	$2, 164, 986
Shellfish ... pounds	1, 010, 333	1, 159, 127	------	2, 169, 460
value	$49, 629	$70, 785	------	$120, 414
Total ... pounds	310, 298, 436	156, 455, 163	131, 370, 967	598, 124, 566
value	$4, 853, 863	$2, 478, 570	$2, 710, 933	$10, 043, 366
WHOLESALE AND MANUFACTURING				
Establishments ... number	87	88	51	226
PRODUCTS AS PREPARED FOR MARKET				
Salmon ... pounds	133, 369, 092	81, 883, 462	58, 834, 928	274, 087, 482
value	$11, 291, 812	$8, 705, 670	$10, 425, 919	$30, 423, 401
Herring ... pounds	36, 673, 926	7, 624, 417	3, 853, 225	48, 151, 568
value	$747, 673	$254, 863	$225, 360	$1, 227, 896
Halibut ... pounds	19, 018, 986	1, 277, 247	129, 400	20, 425. 633
value	$1, 277, 860	$66, 154	$8, 673	$1, 352, 687
Cod ... pounds	------	324, 898	90, 000	414, 898
value	------	$19, 150	$4, 500	$23. 650
Trout ... pounds	60, 194	27, 336	------	87, 530
value	$4, 361	$2, 841	------	$7, 202
Sablefish ... pounds	279, 345	------	------	279, 345
value	$13, 286	------	------	$13, 286
Smelt ... pounds	------	1, 340	------	1, 340
value	------	$80	------	$80
Flounder ... pounds	275, 172	------	------	275, 172
value	$6, 887	------	------	$6, 887
Rockfish ... pounds	22, 919	------	------	22, 919
value	$677	------	------	$677
"Lingcod" ... pounds	526	------	------	526
value	$16	------	------	$16
Clam ... pounds	30, 789	523, 527	------	554, 316
value	$8, 939	$303, 518	------	$312, 457
Shrimp ... pounds	458, 650	1, 400	------	460, 050
value	$184, 197	$250	------	$184. 447
Crab ... pounds	60, 311	60, 612	------	120, 923
value	$22, 004	$20, 062	------	$42, 066
Total ... pounds	190, 249, 910	91, 724, 239	62, 907, 553	344, 881, 702
value	$13, 557, 712	$9, 372, 588	$10, 664, 452	$33, 594, 752

OPERATING UNITS: BY DISTRICTS

Fishermen ... number	4, 183	1, 973	2, 758	8, 914
Vessels, fishing, motor ... do	525	48	9	582
Net tonnage ... do	7, 361	788	267	8, 416
Boats, fishing:				
Motor ... do	946	319	53	1, 318
Other ... do	1, 192	1, 114	1, 336	3, 642

Fisheries of Alaska, 1931—Continued

OPERATING UNITS: BY DISTRICTS—Continued

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
Apparatus:				
Traps ... number	274	202	2	478
Purse seines ... do	325	138	5	468
Yards ... do	114, 710	29, 996	2, 146	146, 852
Haul seines ... do	3	137	3	143
Yards ... do	600	31, 268	410	32, 278
Gill nets ... do	315	1, 828	2, 453	4, 596
Yards ... do	36, 520	165, 196	326, 534	528, 250
Beam trawls ... do	9	1	----------	10
Wheels ... do	----------	----------	259	259
Lines:				
Hand lines (cod fishery) ... do	----------	61	5	66
Trawl lines (cod fishery) ... do	----------	36	----------	36
Troll lines (salmon fishery) ... do	3, 628	----------	----------	3, 628
Skates of lines (halibut fishery) ... do	3, 838	----------	----------	3, 838
Crab pots ... do	320	130	----------	450
Herring pounds ... do	2	12	1	15
Herring-pound seines ... do	14	5	2	21

CATCH: BY DISTRICTS

[Estimated round weight and value to fishermen]

FISH				
Salmon:				
Blueback, red, or sockeye ... pounds	12, 761, 595	40, 116, 195	109, 173, 687	162, 051, 477
value	$375, 991	$1, 055, 584	$2, 563, 855	$3, 995, 430
Chinook or king ... pounds	9, 203, 900	2, 153, 320	2, 248, 200	13, 605, 420
value	$250, 715	$71, 060	$23, 609	$345, 384
Chum or keta ... pounds	25, 656, 714	19, 798, 830	13, 875, 336	59, 330, 880
value	$230, 924	$155, 087	$70, 988	$456, 999
Humpback or pink ... pounds	146, 461, 180	68, 869, 990	25	215, 331, 195
value	$1, 809, 304	$809, 899	----------	$2, 619, 203
Silver or coho ... pounds	10, 368, 891	6, 966, 776	9, 752	17, 345, 419
value	$212, 478	$128, 315	$157	$340, 950
Herring ... pounds	82, 897, 978	15, 048, 720	5, 620, 190	103, 566, 888
value	$621, 735	$112, 865	$42, 151	$776, 751
Halibut ... pounds	21, 132, 207	1, 419, 163	143, 777	22, 695, 147
value	$1, 277, 860	$66, 154	$8, 673	$1, 352, 687
Cod ... pounds	----------	886, 862	300, 000	1, 186, 862
value	----------	$5, 900	$1, 500	$7, 400
Trout:				
Dolly Varden ... pounds	36, 819	34, 170	----------	70, 989
value	$2, 639	$2, 841	----------	$5, 480
Steelhead ... pounds	39, 536	----------	----------	39, 536
value	$1, 722	----------	----------	$1, 722
Sablefish ... pounds	410, 801	----------	----------	410, 801
value	$13, 286	----------	----------	$13, 286
Smelt ... pounds	----------	2, 010	----------	2, 010
value	----------	$80	----------	$80
Flounders ... pounds	282, 413	----------	----------	282, 413
value	$6, 887	----------	----------	$6, 887
Rockfishes ... pounds	35, 260	----------	----------	35, 260
value	$677	----------	----------	$677
"Lingcod" ... pounds	809	----------	----------	809
value	$16	----------	----------	$16
Total ... pounds	309, 288, 103	155, 296, 036	131, 370, 967	595, 955, 106
value	$4. 804, 234	$2, 407, 785	$2, 710, 933	$9, 922, 952
SHELLFISH				
Crabs ... pounds	116, 582	110, 586	----------	227, 168
value	$11, 002	$10, 031	----------	$21, 033
Shrimp ... pounds	832, 563	1, 727	----------	834, 290
value	$36, 839	$50	----------	$36, 889
Clams:				
Butter ... pounds	61, 188	----------	----------	61, 188
value	$1, 788	----------	----------	$1, 788
Razor ... pounds	----------	1, 046, 814	----------	1, 046, 814
value	----------	$60, 704	----------	$60, 704
Total ... pounds	1, 010, 333	1, 159, 127	----------	2, 169, 460
value	$49. 629	$70. 785	----------	$120, 414
Grand total ... pounds	310, 298, 436	156, 455, 163	131, 370, 967	598, 124, 566
value	$4, 853, 863	$2, 478, 570	$2, 710, 933	$10, 043, 366

Industries related to the fisheries of Alaska, 1931

TRANSPORTING

Item		Southeast Alaska	Central Alaska	Western Alaska	Total
Persons engaged	number	591	584	493	1,668
Vessels transporting:					
Steam	do			17	17
Net tonnage	do			30,560	30,560
Motor	do	172	140	70	382
Net tonnage	do	5,141	3,955	3,520	12,616
Scows, houseboats, pile drivers, etc.	do	334	312	190	836

WHOLESALE AND MANUFACTURING

Item		Southeast Alaska	Central Alaska	Western Alaska	Total
Persons engaged	number	4,599	3,396	4,000	11,995
Establishments:					
Handling fresh and frozen fish	do	39	7	1	47
Curing fish	do	31	29	26	86
Canning fish	do	42	55	25	122
Manufacturing by-products	do	7	8		15
Total, exclusive of duplication	do	87	88	51	226

PRODUCTS AS PREPARED FOR MARKET

Item		Southeast Alaska	Central Alaska	Western Alaska	Total
FRESH					
Salmon (all species)	pounds	768,619			768,619
	value	$55,918			$55,918
Salmon eggs (for caviar)	pounds			4,100	4,100
	value			$500	$500
Herring (for bait)	pounds	1,910,100	946,762	29,250	2,886,112
	value	$26,763	$12,469	$351	$39,583
Halibut	pounds	13,681,622	117,070	12,588	13,811,280
	value	$942,135	$8,948	$496	$951,579
Trout	pounds	34,552	21,400		55,952
	value	$3,011	$2,422		$5,433
Sablefish	pounds	1,110			1,110
	value	$30			$30
Smelt	pounds		1,340		1,340
	value		$80		$80
Flounders	pounds	210,000			210,000
	value	$5,250			$5,250
Rockfishes	pounds	4,451			4,451
	value	$134			$134
Crabs:					
Meat	pounds	56,271	43,686		99,957
	value	$21,600	$17,478		$39,078
Whole in shell	pounds	4,040	10,590		14,630
	value	$404	$480		$884
Clams, whole in shell	pounds		240		240
	value		$50		$50
Shrimp:					
Meat	pounds	457,005	400		457,405
	value	$183,950	$100		$184,050
Whole in shell	pounds	1,645	1,000		2,645
	value	$247	$150		$397
Total	pounds	17,129,415	1,142,488	45,938	18,317,841
	value	$1,239,442	$42,177	$1,347	$1,282,966
FROZEN					
Salmon (all species)	pounds	5,969,299	22,800		5,992,099
	value	$392,018	$644		$392,662
Salmon fillets	pounds	190,818			190,818
	value	$19,153			$19,153
Herring (for bait)	pounds	4,675,060	46,625		4,721,685
	value	$36,566	$746		$37,312
Herring (for food)	pounds			236,500	236,500
	value			$9,460	$9,460
Halibut	pounds	5,284,947	1,157,737	116,812	6,559,496
	value	$331,007	$57,019	$8,177	$396,203
Halibut fillets	pounds	52,417			52,417
	value	$4,718			$4,718
Halibut cheeks	pounds		2,032		2,032
	value		$102		$102

Industries related to the fisheries of Alaska, 1931—Continued

PRODUCTS AS PREPARED FOR MARKET—Continued

Item		Southeast Alaska	Central Alaska	Western Alaska	Total
FROZEN—continued					
Trout	pounds	21, 786	5, 936		27, 722
	value	$738	$419		$1, 157
Sablefish	pounds	278, 235			278, 235
	value	$13, 256			$13, 256
Flounders	pounds	65, 172			65, 172
	value	$1, 637			$1, 637
Rockfishes	pounds	18, 468			18, 468
	value	$543			$543
"Lingcod"	pounds	526			526
	value	$16			$16
Total	pounds	16, 556, 728	1, 235, 130	353, 312	18, 145, 170
	value	$799, 652	$58, 930	$17, 637	$876, 219
CURED					
Salmon:					
Mild-cured	pounds	3, 243, 200	16, 800	60, 800	3, 320, 800
	value	$626, 291	$1, 425	$6, 037	$633, 753
Pickled	pounds	77, 800	354, 450	708, 950	1, 141, 200
	value	$6, 121	$31, 161	$66, 226	$103, 508
Dried, smoked, and dry-salted	pounds	7, 600	9, 450	1, 265, 126	1, 282, 176
	value	$380	$945	$76, 935	$78, 260
Herring:					
Pickled (for food)—					
Scotch cure	pounds	1, 759, 475	2, 960, 350	3, 291, 225	8, 011, 050
	value	$107, 097	$167, 217	$199, 493	$473, 807
Norwegian cure	pounds	200	29, 500	130, 800	160, 500
	value	$15	$2, 006	$8, 790	$10, 811
Roused	pounds			92, 400	92, 400
	value			$4, 266	$4, 266
Spiced	pounds	2, 000			2, 000
	value	$250			$250
Dry-salted	pounds			73, 050	73, 050
	value			$3, 000	$3, 000
Cod:					
Dry-salted	pounds		58, 800	90, 000	148, 800
	value		$2, 702	$4, 500	$7, 202
Stockfish	pounds		119, 300		119, 300
	value		$11, 930		$11, 930
Pickled	pounds		146, 398		146, 398
	value		$4, 471		$4, 471
Tongues	pounds		400		400
	value		$47		$47
Trout, pickled	pounds	400			400
	value	$36			$36
Total	pounds	5, 090, 675	3, 695, 448	5, 712, 351	14, 498, 474
	value	$740, 190	$221, 904	$369, 247	$1, 331, 341
CANNED					
Salmon:					
Blueback, red or sockeye	pounds	7, 098, 960	21, 079, 344	53, 147, 040	81, 325, 344
	value	$1, 471, 578	$4, 116, 919	$9, 997, 591	$15, 586, 088
Chinook or king	pounds	715, 008	1, 324, 752	449, 856	2, 489, 616
	value	$134, 825	$276, 690	$75, 872	$487, 387
Chum or keta	pounds	13, 163, 904	9, 266, 544	3, 194, 640	25, 625, 088
	value	$891, 375	$607, 108	$202, 202	$1, 700, 685
Humpback or pink	pounds	96, 645, 216	45, 140, 064		141, 785, 280
	value	$7, 052, 803	$3, 162, 695		$10, 215, 498
Silver or coho	pounds	4, 245, 840	3, 903, 888	4, 416	8, 154, 144
	value	$616, 541	$489, 537	$556	$1, 106, 634
Trout	pounds	3, 456			3, 456
	value	$576			$576
Miscellaneous fish	pounds	5, 328	5, 640		10, 968
	value	$999	$1, 035		$2, 034
Clams	pounds	30, 789	523, 287		554, 076
	value	$8, 939	$303, 468		$312, 407
Crabs	pounds		6, 336		6, 336
	value		$2, 104		$2, 104
Total	pounds	121, 908, 501	81, 249, 855	56, 795, 952	259, 954, 308
	value	$10, 177, 636	$8, 959, 556	$10, 276, 221	$29, 413, 413

Industries related to the fisheries of Alaska, 1931—Continued

PRODUCTS AS PREPARED FOR MARKET—Continued

Item		Southeast Alaska	Central Alaska	Western Alaska	Total
BY-PRODUCTS					
Fertilizer, salmon	pounds	1, 020, 000	565, 288		1, 585, 288
	value	$20, 040	$9, 054		$29, 094
Meal, herring	pounds	14, 000, 276	1, 822, 700		15, 822, 976
	value	$242, 736	$30, 089		$272, 825
Oil:					
Salmon	pounds	217, 500	194, 850		412, 350
	value	$3, 770	$8, 542		$12, 312
Herring	pounds	14, 326, 815	1, 818, 480		16, 145, 295
	value	$334, 246	$42, 336		$376, 582
Total	pounds	29, 564, 591	4, 401, 318		33, 965, 909
	value	$600, 792	$90, 021		$690, 813
Grand total	pounds	190, 249, 910	91, 724, 239	62, 907, 553	344, 881, 702
	value	$13, 557, 712	$9, 372, 588	$10, 664, 452	$33, 594, 752

SUPPLEMENTARY TABLE SHOWING THE PACK OF CANNED PRODUCTS IN "STANDARD CASES" [1]

Item		Southeast Alaska	Central Alaska	Western Alaska	Total
Salmon:					
Blueback, red or sockeye	cases	147, 895	439, 153	1, 107, 230	1, 694, 278
	value	$1, 471, 578	$4, 116, 919	$9, 997, 591	$15, 586, 088
Chinook or king	cases	14, 896	27, 599	9, 372	51, 867
	value	$134, 825	$276, 690	$75. 872	$487, 387
Chum or keta	cases	274, 248	193, 053	66, 555	533, 856
	value	$891, 375	$607, 108	$202, 202	$1, 700, 685
Humpback or pink	cases	2, 013, 442	940, 418		2, 953, 860
	value	$7, 052, 803	$3, 162, 695		$10, 215, 498
Silver or coho	cases	88, 455	81, 331	92	169, 878
	value	$616, 541	$489, 537	$556	$1, 106, 634
Trout	cases	72			72
	value	$576			$576
Miscellaneous fish	cases	111	118		229
	value	$999	$1, 035		$2, 034
Clams	cases	2, 039	34, 886		36, 925
	value	$8, 939	$303, 468		$312, 407
Crabs	cases		132		132
	value		$2, 104		$2, 104
Total	cases	2, 541, 158	1, 716, 690	1, 183, 249	5, 441, 097
	value	$10, 177, 636	$8, 959. 556	$10, 276, 221	$29, 413, 413

SUPPLEMENTARY TABLE SHOWING THE OUTPUT OF BY-PRODUCTS IN TONS AND GALLONS

Item		Southeast Alaska	Central Alaska	Total
Fertilizer, salmon	tons	510	283	793
	value	$20, 040	$9, 054	$29, 094
Meal, herring	tons	7, 000	911	7, 911
	value	$242, 736	$30, 089	$272, 825
Oil:				
Salmon	gallons	29, 000	25, 980	54, 980
	value	$3, 770	$8, 542	$12, 312
Herring	gallons	1, 910, 242	242, 464	2, 152, 706
	value	$334, 246	$42, 336	$376, 582
Total	value	$600, 792	$90, 021	$690, 813

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[1] The pack of salmon, trout, miscellaneous fish, and crabs has been converted to "standard cases" of 48 one-pound cans, and clams to "standard cases" of 48 No. 1 five-ounce cans.

NOTE.—Halibut products include all taken by the Alaska fleet, some of which were landed at other than Alaskan ports. The total landings in Alaska in 1931 amounted to 9,626,118 pounds, valued at $608,480, as compared with 11,408,984 pounds, valued at $863,089, in 1930.

FISHERIES OF PUERTO RICO

A general survey of the fisheries of Puerto Rico was made in 1899, immediately after the American occupation of that island, but no detailed data on catch, fishermen, and gear employed were secured. The survey made in 1931 was the first statistical and marketing survey made of the fisheries of Puerto Rico.

During 1930, the fisheries of Puerto Rico employed 1,403 fishermen. Their catch amounted to 3,080,100 pounds of fishery products valued at $207,085 to the fishermen. In making the catch the fishermen used 9 motor boats, 240 sailboats, and 462 rowboats. The gear employed consisted of 91 haul seines, 285 gill nets, 14 trammel nets, 366 cast nets, 31 dip nets, 9 hoop nets, 15 weirs (corrals), 912 hand lines, 133 trawl lines, 334 troll lines, and 4,239 fish pots.

As the fishermen keep no records of their operations, it was impossible to separate the catch by species. In general it may be stated that about 50 per cent of the catch is taken by fish pots, 30 per cent by nets, and 20 per cent by lines or other apparatus.

Fisheries of Puerto Rico, 1930

Persons engaged, fishermen	1,403
Boats:	
Motor	9
Sail	240
Row	462
Apparatus:	
Haul seines	91
Length, yards	19,820
Gill nets	285
Square yards	55,835
Trammel nets	14
Square yards	6,940
Cast nets	366
Dip nets	31
Hoop nets	9
Fish pots	4,239
Weirs or corrals	15
Lines—	
Hand	912
Hooks	2,501
Trawl	133
Hooks	18,087
Troll	334
Hooks	334
Forks (used in taking langosta or spiny lobster)	46
Catch—	
Pounds	3,080,100
Value	$207,085

COMMON AND SCIENTIFIC NAMES OF FISHERY PRODUCTS

In order to prevent misunderstanding from the use of common names employed in the tables and discussions, the following list of common and scientific names is given:

Common and scientific names of the commercial fishery products caught in the United States and Alaska

Common name as shown in bureau reports	Other common names	Scientific names
Albacore	Longfin tuna	*Germo alalunga.*
Alewives	Branch herring, wall-eyed or big-eyed herring.	*Pomolobus pseudoharengus.*
	Blueback, glut herring	*Pomolobus æstivalis.*
Amberjack		Seriola species.
Anchovies		*Engraulis mordax.* *Anchoviella delicatissima.* *Anchoviella compressa.*
Angelfish		*Pomacanthus arcuatus.* *Angelichthys isabelita.*
Barracuda		*Sphyræna argentea* (Pacific coast). *Sphyræna barracuda* (Atlantic coast).
Black bass	Smallmouth bass	*Micropterus dolomieu.*
	Largemouth bass	*Micropterus salmoides.*
Bluefish	Tailor	*Pomatomus saltatrix.*
Blue pike	Pike perch, blue pickerel (Canada)	*Stizostedion glaucum.*
Blue runner or hardtail	Runner	*Caranx crysos.*
Bonito		*Sarda sarda.* *Sarda chiliensis.*
Bowfin		*Amia calva.*
Buffalofish		Ictiobus species.
Bullhead		Ameiurus species.
Butterfish	Dollarfish	*Poronotus triacanthus.*
Burbot	Lawyer, ling	*Lota maculosa.*
Cabio	Coalfish, crab eater, cobia	*Rachycentron canadum.*
Cabrilla	Rock bass	*Paralabrax clathratus.*
Carp (German)		*Cyprinus carpio.*
Catfish		Siluridæ species.
Cero		*Scomberomonus regalis.*
Chubs	Tullibee in Canada, longjaws, bluefin, blackfin in United States.	All Leucichthys except *artedi* (in Great Lakes).
Cigarfish	Scad	Decapterus species.
Cisco	Herring in Canada	*Leucichthys artedi* (Lake Erie only).
Cod	Codfish	*Gadus macrocephalus* (Pacific coast.) *Gadus callarias* (Atlantic coast).
Cowfish	Trunkfish, chapin	Ostracion species.
Crappie	White crappie	*Pomoxis annularis.*
	Black crappie, strawberry bass, calico bass.	*Pomoxis sparoides.*
Crevalle		*Caranx hippos.*
Croaker	Crocus, hardhead	*Micropogon undulatus.*
Cunner	Chogset, blue perch, bergall	*Tautogolabrus adspersus.*
Cusk		*Brosmius brosme.*
Dolly Varden trout	Salmon trout, bull trout	*Salvelinus parkei.*
Dolphin		*Coryphaena hippurus.*
Drum, fresh-water, or sheepshead.	White perch, gaspergou	*Aplodinotus grunniens.*
Drum, black		*Pogonias cromis.*
Drum, red	Channel bass, redfish, spotted bass	*Sciænops ocellatus.*
Eels		*Anguilla rostrata.* *Leptocephalus conger.* *Gymnothorax mordax.* *Gymnothorax moringua.*
Eulachon	Candlefish	*Thaleichthys pacificus.*
Flounders	Dabs, blackbacks, lemon sole, winter flounder, summer flounder.	Pleuronectidae species.
Flyingfish		*Cysilurus californicus.*
Frigate mackerel		*Auxis thazard.*
Garfish		Tylosurus species. Ablennes species.
Gizzard shad	Nanny shad, mud shad	*Dorosoma cepedianum.*
Goldeye		Hiodon species.
Goldfish	Sand perch	*Carassius auratus.*
Goosefish		*Lophius piscatorius.*
Grayfish	Dogfish	*Squalus sucklii* (Pacific coast).
	Spiny dog	*Squalus acanthias.*
	Smooth dog	*Galeohinus lævis.*
Greenfish	Rudderfish	*Girella nigricans.*
Groupers		Epinephelus species. Mycteroperca species.
Grunts	Margatefish, sailors choice (Key West).	Hæmulon species.
Haddock		*Melanogrammus aegilfinus.*
Hagfish	Slimefish	*Myxine glutinosa.*
Hake	Squirrel hake, Boston hake, ling, black hake, mud hake.	Urophycis species (Atlantic coast).
	Merluccio	*Merlucius productus* (Pacific coast).
Halfmoon		*Medialuna californiensis.*
Halibut		*Hippoglossus hippoglossus.*
Halibut, "California"		*Paralichthys californicus.*

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in bureau reports	Other common names	Scientific names
Hardhead		*Orthodon microlepidotus.*
Harvestfish	Starfish, pappyfish	*Peprilus alepidotus.*
Herring		*Clupea harengus* (Atlantic coast). *Clupea pallasii* (Pacific coast).
Hickory shad	Tailor shad	*Pomolobus mediocris.*
Hog-choker		*Achirus fasciatus.*
Hogfish	Capitaine, perro perro	*Lachnolaimus maximus* (Florida).
Horse mackerel		*Trachurus symmetricus.*
Jewfish		*Promicrops itaiara.*
Kingfish		*Scomberomorus cavalla.*
Kingfish (California)	Little roncador, croaker	*Genyonemus lineatus.*
King whiting	Northern whiting, kingfish, seamink	Menticirrhus species.
Ladyfish	Bonefish, bananafish	*Albula vulpes.*
Lake herring	Herring	*Leucichthys artedi* (Great Lakes, except Erie).
Lake trout		*Cristivomer namaycush.*
Launce	Sand eel, lant, sand launce	*Ammodytes americanus.*
"Lingcod"	Cultus cod, blue cod, buffalo cod, ling	*Ophiodon elongatus.*
Mackerel		*Scomber scombrus* (Atlantic coast). *Scomber diego* (Pacific coast).
Menhaden	Mossbunker, pogy	*Brevoortia tyrannus.*
Minnows		Cyprinidae species.
Mojarro		Eucinostomus species.
Mooneye	Toothed herring	Hiodon species.
Moonfish		*Vomer setipinnis.* *Selene vomer.*
Mullet	Jumping mullet	Mugil species.
Mummichog	Mayfish, killifish	Fundulus species.
Muttonfish		*Lutianus analis.*
Paddlefish	Spoonbill cat	*Polyodon spathula.*
Parrotfish		Scaridæ species.
Perch, white	White perch Blue perch, surf-fishes	*Morone americana.* Embiotocidæ species (Pacific coast).
Perch, yellow	Winged perch	*Perca flavescens.*
Permit	Great pompano	*Trachinotus goodei.*
Pickerel		*Esox reticulatus.* *Esox americanus.*
Pigfish		*Orthopristis chrysopterus.*
Pike (jacks)	Great Lakes pike, pickerel	*Esox lucius.*
Pilchard	Sardine	*Sardinia cærulea.*
Pilotfish		*Naucrates ductor.* *Seriole zonata.*
Pinfish	Bream, salt-water bream	*Lagodon rhomboides.*
Pollock		*Pollachius virens.*
Pompano		Trachinotus species (Atlantic coast). *Palometa simillimus* (Pacific coast).
Porgies	Porgee	Calamus species.
Porkfish	Sisi	*Anisotremus virginicus.*
Quillback	Spearfish or skimfish	Carpiodes species.
Roach	Shiner	*Notemigonus crysoleucas.*
Rock bass	Redeye, goggleeye	*Ambloplites rupestris* (Mississippi River and tributaries).
Rockfishes	Rock cod	Sebestodes species (Pacific coast).
Rosefish		*Sebastes marinus.*
Sablefish	Black cod	*Anaplopoma fimbria.*
Salmon:		
Atlantic		*Salmo salar* (Atlantic coast).
Pacific—		
Blueback, red or sockeye.		*Oncorhynchus nerka.*
Chinook or king	Tyee, Columbia, Sacramento, spring	*Oncorhynchus tschawytscha.*
Chum or keta	Dog salmon	*Oncorhynchus keta.*
Humpback or pink.		*Oncorhynchus gorbuscha.*
Silver or coho		*Oncorhynchus kisutch.*
Steelhead		(See steelhead trout.)
Sauger pike	Sand pike	*Stizostedion canadense.*
Sawfish		*Pristis pectinatus.*
Scamp		*Mycteroperca phenax.*
Sculpin		Cottidæ species.
Scup	Paugy or porgy, fair maid	*Stenotomus chrysops.*
Sea bass	Black jewfish or black sea bass Black sea bass	*Stereolepis gigas* (Pacific coast.) *Centropristes striatus* (Atlantic coast).
Sea bass, white (California)		*Cynoscion nobilis* (Pacific coast).
Sea gar	Needlefish, billfish, houndfish	Tylosurus species.
Sea robin		Prionotus species.
Shad	American shad	*Alosa sapidissima.*
Sharks		Carcharodon species; Mustelus species; Carcharhinus species; Sphyrna species.

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in bureau reports	Other common names	Scientific names
Sheepshead (salt-water)		*Archosargus probatocephalus.*
Sheepshead (fresh-water)	Drum, fresh-water	*Aplodinotus grunniens.*
Sheepshead (Pacific coast)	Redfish, flat head	*Pimelometopon pulcher.*
Silversides	Spearing	Menidia species.
Silver perch	Sand perch	*Bairdiella chrysura.*
Skates		Raja species.
Skipjack	Striped tuna	*Euthynnus pelamys.*
Skipper	"Billfish"	*Scomberesox saurus.*
Smelt		*Osmerus mordas* (Atlantic coast). Argentinidæ species (Pacific coast).
Snapper, Mangrove	Gray snapper	*Lutianus griseus.*
Snapper, red		*Lutianus blackfordii.*
Snook	Robalo, sergeantfish	*Centropomus undecimalis.*
Sole		*Psettichthys melanostictus* (Pacific coast).
Spadefish		*Chaetodipterus faber.*
Spanish mackeral		*Scomberomorus maculatus.*
Spearfish		*Tetrapturus imperator.*
Splittail		*Pogonichthys macrolepidotus.*
Spot	Lafayette, goody	*Leiostomus xanthurus.*
Squawfish	Sacramento pike	*Ptychocheilus oregonensis.*
Squeteague (gray)	Gray trout, weakfish, trout	*Cynoscion regalis.*
Squeteague (spotted)	Spotted weakfish, spotted trout	*Cynoscion nebulosus.*
Squirrelfish		*Diplectrum formosum.*
Steelhead trout	Salmon trout	*Salmo gairdneri.*
Stingray		Dasyatis species.
Striped bass	Rockfish, rock	*Roccus lineatus.*
Sturgeon		Acipenser species.
Sturgeon, shovelnose		*Scaphirrhynchus platorynchus.*
Sucker	Fresh-water mullet	Catostomidæ species.
Sunfish		Lepomis species. Centrarchidæ species.
Surf fishes		Embiotocidæ species.
Swellfish	Puffer, swell toad, balloonfish, globefish.	*Spheroides maculatus.*
Swordfish		*Xiphias gladius.*
Tang		Hepatus species.
Tarpon	Silver king	*Tarpon atlanticus.*
Tautog	Blackfish, oysterfish	*Tautoga onitis.*
Tenpounder	Elops	*Elops saurus.*
Thimble-eyed mackerel	Bullseye	*Scomber colias.*
Tilefish		*Lopholatilus chamæleonticeps.*
Tomcod		*Microgadus tomcod* (Atlantic coast). *Microgadus proximus* (Pacific coast).
Tripletail		*Lobotes surinamensis.*
Tuna	Bluefin tuna, tunny, horse mackerel, leaping tuna.	*Thunnus thynnus.*
Turbot	Greenland halibut, American turbot	*Reinharditus hippoglossoides.* *Balistes carolinensis.*
White bass	White lake bass	*Roccus chrysops.*
Whitebait		Small fry of any fish.
Whitefish		*Coregonus clupeiformis* (Great Lakes). *Caulolatilus princeps* (Pacific coast).
Whitefish (Menominee)		*Coregonus clupeaformis.*
Whiting	Silver hake	*Merluccius bilinearis.*
Wolffish		*Anarrhichas lupus.*
Yellow bass		*Morone interrupta.*
Yellow perch		*Perca flavescens.*
Yellow pike	Wall-eyed pike, pike perch, dore	*Stizostedion vitreum.*
Yellowfin tuna		*Neothunnus macropterus.*
Yellowtail		*Ocyurus chrysurus* (Atlantic coast). *Seriola dorsalis* (Pacific coast).
Wahoo		Acanthocybium solandri.
Abalone		Halotis species.
Clams:		
Hard	Round clam, cherrystone, quahog, little neck.	*Tivela stultorum* (Pacific coast). *Venus mercenaria* (Atlantic coast). *Venus mortoni* (Florida coast).
Cockle		*Cardium corbis.*
Soft	Sand clam, soft-shelled clam, nannynose, maninose.	*Mya arenaria.*
Surf	Skimmer	*Mactra solidissima.*
Razor (Atlantic)		Siliqua species; Tagelus species.
Razor (Pacific)		*Siliqua patula.*
Pismo		*Tivela stultorum* (Pacific coast).
Conchs		Strombus species. Busycon species.

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in bureau reports	Other common names	Scientific names
Crabs:		
Stone		*Menippi mercenaria.*
Soft	Soft-shelled crab, blue crab	*Callinectes sapidus.*
Hard	Hardshell crab, blue crab	Do.
	Dungeness crab	*Cancer magister* (Pacific coast).
	Rock crab, hard crab	*Cancer irroratus* (Atlantic coast).
King	Horseshoe crab	Limulus.
Spider	Toad crab	*Hyas coarctatus.*
Crawfish	Crayfish	Cambarus species (Atlantic coast). Astacus species (Pacific coast).
Lobsters:		
Common		*Homarus americanus* (Atlantic coast).
Spiny	Rock lobster, crayfish	*Panulirus interruptus* (Pacific coast). *Panulirus argus* (Atlantic coast).
Mussels:		
Sea		*Mytilus californianus* (Pacific coast). *Mytilus edulis.*
Freshwater		Quadrula species. Lampsilis species. Symphynota species. Unio species.
Octopus		*Octopus punctatus* (Pacific coast).
Oysters:		
Eastern		*Ostrea elongata.*
Western	Olympia	*Ostrea lurida* (Pacific coast).
Japanese (introduced)		*Ostrea gigas.*
Periwinkles		Littorina species.
Scallops:		
Sea		*Pecten magellanicus.*
Bay		*Pecten irradians* (Atlantic coast). *Pecten æquisulcatus* (Pacific coast).
Shrimp		*Peneus setiferus.* *Peneus brasiliensis* (Atlantic and Gulf coasts). Pandalus species (Pacific coast). Pandalopsis species (Pacific coast). Crangon species (Pacific coast).
Snails		Gastropoda species.
Squid		*Loligo opalescens* (Pacific coast). *Loligo pealei* (Atlantic coast).
Turtles:		
Green		Chelonia mydas.
Loggerhead		*Thalassochelys caretta.*
Hawksbill		*Chelonia inbricata.*
Snapping	Mud turtle, mossback	*Chelydra serpentina.*
Terrapin	Diamond-back terrapin	*Malacoclemmys palustris.*
Frogs		Rana species.
Irish moss		*Chondrus crispus.*
Kelp		Macrocystis species; Nereocystis species; Pelagophycus species; Alaria species.
Sponges:		
Glove		*Spongia graminea* (Hyatt) *Euspongia officianalis* (L.).
Grass		*Hippospongia equina cerebriformis.*
Sheepswool		*Hippospongia canaliculata gossypina.*
Yellow		*Hippospongia equina elastica.*
Trepang	Sea cucumber	*Cucumaris frondosa; Thyone briareus.*

STATISTICAL SURVEY PROCEDURE

METHODS OF COLLECTION

In order that persons using the statistics in this report may judge as to their completeness and authenticity, there follows an outline of the methods employed by the bureau in collecting fishery statistics. It will be noted that several methods are used. Each method has been carefully studied to obtain the best results with the available personnel.

General fishery statistics.—In the collection of general fishery statistics, data are obtained on the catch of fishery products and its value as landed by the fishermen, the quantity or number of each kind of gear used, the number of fishing boats, the number and net tonnage of fishing and transporting vessels, the number of wholesale establishments, the amount of wages and salaries paid in these establishments, the quantity and value of products prepared, and the number of persons engaged in each phase of the industry.

The scope of the coastal surveys includes the commercial fisheries of the oceans, bays, and coastal rivers as far inland as commercial fishing is important. This usually coincides with the range of commercial fishing for anadromous species. Statistics of the fisheries of the Mississippi River include the fisheries of the Mississippi River proper, as well as all tributaries wherein commerical fishing for either fish, crustaceans, or mollusks is prosecuted. Statistics of the lake fisheries include those prosecuted in the Great Lakes, adjacent bays, and the international lakes of northern Minnesota, as well as certain rivers having outlets into these waters.

Beginning in 1929 general fishery statistics have been collected on an annual basis for all of the marine and lake sections of the United States and Alaska.

In conducting these surveys it is the custom of the bureau to dispatch agents to the districts to be surveyed early in the calendar year. (It should be noted that statistics on the catch of oysters for 1930 cover the calendar year. In previous years statistics for this mollusk were for the oyster season.) They obtain statistics on operations during the previous calendar year. The agents conducting these surveys are trained men or recruits working under the close supervision of trained men. Recruits are permitted to work individually only after proving a satisfactory aptitude for the work during their training period. While it is impossible for the few agents available to interview each fisherman in a given locality, the more important ones are visited and a sufficient number of those of lesser importance are interviewed to obtain reliable information on their production. In practice, virtually all wholesale firms are visited, as well as captains of fishing vessels (those of 5 net tons or over) and also all the more important shore fishermen and representative small producers.

As an aid in locating fishermen, lists of vessels and motor-boat owners are obtained from local customhouses. It is also often possible to obtain the names of licensed commercial fishermen and occasionally some statistics of the catch from the various State fishery agencies. In the Great Lakes and Pacific Coast States such exceptional cooperation has been obtained from the State agencies in recent years that only fragmentary surveys are made by the bureau to supplement missing data. Virginia and Maryland have recently adopted very complete statistical plans.

For the Great Lakes and international lakes of northern Minnesota the bureau obtains catch statistics and usually the value of the catch direct from the State records. To obtain data on the fishermen, boats, vessels, and gear the bureau conducts such personal surveys among the fishermen as may be necessary to supplement the State records. Annual catch statistics are available since 1913.

Agents are stationed at Seattle, Wash., who survey each of the Pacific Coast States annually to supplement data that are missing from the State records. In most cases the value of the catch is derived from dealers' records and from estimates of prices. In

Washington and Oregon the offshore fisheries are surveyed separately for units of operation, catch, and value of the catch. In almost all other respects the statistics are as collected by the States. Statistics of the wholesale industry for this section are obtained largely by personal interview.

The fisheries of Alaska are conducted primarily by large operators. Sworn statements are required from these operators concerning their operations. These are collected and compiled by the Alaska division of this bureau.

Statistics on the catch of fish collected in the above general canvasses are shown in this report on the basis of round weight, that is, the weight of the fish as caught, except in the Pacific Coast States where "as landed" weights are shown.

In general in the Pacific Coast States halibut is landed heads on but eviscerated; tuna and tunalike fishes are landed headless and eviscerated; swordfish may be landed headless and eviscerated; some salmon, especially that caught by troll lines, may be eviscerated; "lingcod," rockfishes, and sablefish may be landed eviscerated. The weight of cod caught off Alaska and shown in the Pacific coast tables has been converted to the basis of round weight.

Bulletins containing statistics for each section are released following the survey.

Landings at certain important United States ports.—Statistics of the landings at the principal New England ports, Boston and Gloucester, Mass., and Portland, Me., are similarly obtained. An agent is permanently stationed at each of these ports. His duties include the obtaining of statistics on the quantity of fish landed each day by each fishing vessel, the value of such fish landed, information concerning the date of departure and arrival of the vessel, and also a list of the grounds from which the fish were taken and the gear used in their capture. These statistics are forwarded to the bureau, where compilations are made. Monthly statistical bulletins are issued for these landings as well as annual bulletins summarizing the year's activities.

Statistics of the landings of fish at Seattle, Wash., are collected by the bureau's agent in that city. Landings are classified as those made by American fishing vessels and those received by Seattle wholesale dealers. The landings credited to United States fishing vessels are made by vessels operating distinctly as primary fishing units, usually in the offshore fisheries, while those credited as received by wholesale dealers are usually products of the shore fisheries collected mainly from points in Puget Sound and do not include fish received from Alaska or Canada, or landings made by the halibut fleet. Monthly statistical bulletins are issued for these landings as well as annual bulletins summarizing the year's activities.

Statistics on the landings of fish at New York City are obtained by J. H. Matthews, executive secretary of the Middle Atlantic Fisheries Association, while those for Groton, Conn., are obtained by the bureau's agents. Statements of these landings are forwarded to the bureau, where they are compiled. These statistics have not included the value of the catch. Monthly bulletins including these data are not issued; however, a summary is published in this document.

Statistics of the fishery products handled at the municipal wharf, Washington, D. C., are reported to the bureau by agents of the city health department. They are not published in bulletin form, but a summary of the year's activities is published in the annual report of this division.

Atlantic mackerel fishery.—Statistics on the catch by the Atlantic mackerel fleet are obtained by combining the figures of mackerel landed at Boston and Gloucester, Mass., and Portland, Me., with those obtained by agents who in recent years have been stationed at other Atlantic ports where mackerel are landed. These agents obtain data on the fares of mackerel landed, similar to the data obtained on the landings by fishing vessels at the three New England ports. The figures include only the catches made by purse seine and drift gill net craft and are not complete for these gears for craft under 5 net tons, capacity. Statistics of this fishery appear only in the annual reports of this division, although the landings at the principal New England ports appear in the monthly and annual bulletins published for those ports.

Shad and alewife fisheries.—Due to the importance of the Hudson and Potomac Rivers in the production of shad, surveys for the statistics of the catch, value of the catch, and operating units are made annually. On the Potomac River similar statistics also are obtained for the alewife fishery. The surveys are conducted by agents in a manner similar to that employed in the collection of general fishery statistics, except that probably more fishermen are interviewed, as great care is exercised to make these canvasses as accurate as possible.

The State of New York obtains statistics for the fisheries of the Hudson River that closely parallel those desired by the bureau for this fishery, which alleviates the work on this river.

Statistics of the shad and alewife fisheries are not published separately in bulletin form, but a summary of the year's activities is published in the annual report of this division.

Sponge market, Tarpon Springs.—A large proportion of the total output of sponges in Florida is handled through the sponge exchange at Tarpon Springs. In view of this, the bureau has arranged with a representative of the exchange to furnish statistics of the quantity and value of the sponges, by variety classification, handled through it annually. Statistics of the quantity of sponges handled through the exchange are not published in bulletin form, but a summary of the year's activities is published in the annual reports of this division.

Pacific halibut fishery.—Statistics of the Pacific halibut fishery are obtained by the bureau's agent in Seattle, aided by bureau representatives in Alaska, American consuls in British Columbia, the International Fisheries Commission, and the Prince Rupert Halibut Exchange. The fleet classification has been arbitrarily applied by including in the "Washington fleet" all United States and Alaska vessels that land more than half of their catch in that State. All other United States and Alaska vessels of the halibut fleet are included in the "Alaska fleet." Monthly and annual statistical bulletins are available on this fishery, being published along with the statistics of the landings of fishery products at Seattle, Wash.

Canned fishery products and by-products.—Beginning in 1921, the bureau has made annual surveys for statistics of the canned fishery products and by-products industries. These are begun the first week in January of each year for statistics of the production in the preceding year. The surveys usually occupy six to nine weeks' time. During this period agents visit each plant in the United States where there is a production of canned fishery products or by-products. They obtain statistics of the production and value of the production for each commodity. In rare instances, where plants are not easily reached by regular transportation facilities, returns are obtained by mail.

The value shown for canned products constitutes the gross amount received by the packer at the production point, no deductions being made for commissions or expenses.

Statistics of the canned fishery products and by-products produced in Alaska are received on the same sworn statements that include statistics of the general fisheries. An annual statistical bulletin is issued on this trade.

Manufactured fishery products.—Statistics were obtained for 1930 for the first time on the total production of the many fishery products manufactured in the marine and lakes sections of the United States. These data appear only in the annual report of this division.

Packaged-fish trade.—Complete statistics of the annual production and value of fish packaged in the United States are obtained as a part of the survey for statistics of the canned fishery products and by-products industries. These statistics are published in bulletin form annually.

Cold-storage holdings of fish.—An arrangement has been made with the Bureau of Agricultural Economics, Department of Agriculture, whereby statistics of the cold-storage holdings of the various species of fish, by sections of the United States, are furnished to this bureau monthly. Included with statistics of the holdings is a statement of the quantity of the various species of fish frozen and also the holdings of certain cured fish. Bulletins showing these statistics are issued monthly as well as annually.

Foreign fishery trade.—Statistics on the foreign fishery trade are obtained from compilations made by the Bureau of Foreign and Domestic Commerce. Statistics of all known fishery products imported or exported are assembled in one table and published annually in the report of this division.

COMPILATION PRACTICES

Certain practices of importance used in the compilation of fishery statistics are explained below.

Days absent.—In computing "days absent" for vessels landing fares at the various ports, the day of departure and the day of arrival are included; thus, a vessel leaving port on the 8th of the month and returning on the 15th of the month will be shown as being absent eight days.

Operating units.—Operating units as referred to in this document include persons engaged and fishing craft and gear employed.

Vessels.—The term "vessels" refers to craft having a capacity of 5 net tons or greater.

Incidental catch.—The term "incidental catch" refers to the catch of certain species by a type of gear which ordinarily does not take appreciable amounts, if any, of such species.

Percentages.—Percentages are usually shown as whole numbers. Fractions of per cents are dropped if less than five-tenths, and the percentage is raised to the next higher integer if the fraction is greater than five-tenths. If the fraction is exactly five-tenths, the integer is raised or lowered to make it an even number.

Converting.—Many of the figures shown in the statistical tables published herewith have been reduced to thousands of pounds or dollars. In making these conversions the largest number from which a group of items is computed is raised or lowered to the nearest thousands place. If the number ends in an even 500, the thousands integer is raised or lowered to make it an even number. The individual items are changed to conform to the total thus obtained.

CONVERSION FACTORS

It is the policy of the bureau to show the detailed catch figures of all products in pounds for the sake of uniformity and for purposes of comparison. Following such a policy presents very definite problems. In the case of fish there is little difficulty since in very rare instances are such products reported in units of measure other than pounds. For shellfish, however, the units of measure may be bushels, sacks, barrels, or thousands of shellfish, gallons of meats, etc. These many units make standardization difficult, but when coupled with the wide variation in the requirements or definition of some of these units in the various States the problem becomes even more complex.

All bivalve mollusks are reported in pounds of meats in the detailed catch tables presented in this report. In addition there is presented a supplementary table for each section on the production in bushels. These supplementary tables also give the production of certain other shellfish, such as crabs, in number.

Oysters.—Probably the greatest problem in presentation of fishery statistics in uniform units of measure is in the case of oysters. Usually the production of oysters on the Atlantic and Gulf coasts is reported to bureau agents in bushels and prior to the data shown in this report conversion from bushels to pounds of meats was effected on the basis of a uniform yield of 7 pounds of meat to the bushel. There follows a table which gives the results of a recent study of the measures used for oysters in the various States and of the average yields per bushel. This table presents the new factors that have been used in the oyster statistics given in this report. These figures apply to the year 1930 and are based on the records of oyster canneries and shucking houses. It is probable that in subsequent years there will be variations from these figures.

Measures and yields of oysters

State	Capacity of State bushel	Variation from United States standard bushel		Market oysters		Seed oysters	
		Cubic inches	Per cent	Yield per State bushel	Yield per standard bushel	Yield per State bushel	Yield per standard bushel
	Cubic inches			Pounds of meat	Pounds of meat	Pounds of meat	Pounds of meat
Massachusetts	2,150.4	----------	----------	8.8	8.8	7.0	7.0
Rhode Island	2,150.4	----------	----------	8.0	8.0	7.0	7.0
Connecticut	2,150.4	----------	----------	7.5	7.5	7.0	7.0
New York	2,150.4	----------	----------	7.0	7.0	7.0	7.0
New Jersey	2,257.3	+126.9	+5.0	8.41	7.96	4.5	4.26
Delaware	2,257.3	+126.9	+5.0	7.5	7.1	4.5	4.26
Maryland	2,801.5	+650.1	+30.2	7.413	5.69	5.0	3.84
Virginia	3,003.4	+853.0	+39.7	6.86	4.91	5.0	3.58
North Carolina	2,801.9	+651.5	+30.3	5.36	4.11	----------	----------
South Carolina	4,071.5	+1,921.1	+89.3	4.61	2.44	----------	----------
Georgia	2,753.4	+603.0	+28.0	4.41	3.44	----------	----------
Florida	3,214.1	+1,063.7	+49.4	3.34	2.23	----------	----------
Alabama	2,826.2	+675.8	+31.4	3.23	2.46	----------	----------
Mississippi	2,826.2	+675.8	+31.4	1.91	1.45	----------	----------
Louisiana	2,148.4	−2.0	−0.1	3.99	3.99	----------	----------
Texas	2,700.0	+549.6	+25.6	4.65	3.70	----------	----------

Other mollusks.—Whereas in previous reports certain other mollusks have been converted from bushels to pounds of meats on the basis of an average yield for the whole country, a more detailed study established the factors for the various States for 1930 which are shown in the following table.

Average yields of certain mollusks in pounds of meats per bushel

State	Clams, hard		Clams, soft		Clams, surf	Cockles	Mussels, sea	Periwinkles	Scallops, sea and bay
	Public	Private	Public	Private					
Maine	--------	--------	17	17	--------	10	--------	--------	--------
Massachusetts	11	11	17	--------	12	18	10	18	6
Rhode Island	11	11	17	--------	--------	--------	--------	18	6
Connecticut	8	--------	15	--------	--------	--------	--------	--------	6
New York	9	10	15	15	12	--------	10	--------	6
New Jersey	8	10	12	12	12	--------	10	--------	6
Delaware	8	8	--------	--------	--------	--------	10	--------	--------
Maryland	8	--------	--------	--------	--------	--------	--------	--------	--------
Virginia	8	--------	--------	--------	--------	--------	--------	--------	6
North Carolina	10	--------	--------	--------	--------	--------	--------	--------	--------
South Carolina	10	--------	--------	--------	--------	--------	--------	--------	--------
Georgia	10	--------	--------	--------	--------	--------	--------	--------	--------
Florida	8	8	--------	--------	--------	--------	--------	--------	6

Other conversion factors.—The principal other conversion factors that have been used in this report are as follows:

Alewives	To convert number of fish to weight in pounds, multiply by 0.4.
Cod, large, salted	To convert to fresh-gutted weight, multiply by 1.90.
Cod, market, salted	To convert to fresh-gutted weight, multiply by 1.94.
Cod, scrod, salted	To convert to fresh-gutted weight, multiply by 1.98.
Cod, all sizes, fresh-gutted	To convert to round weight, multiply by 1.25.

Crustaceans:	
Crabs, soft (all States)	To convert number of crabs to weight in pounds, divide by 3.
Crabs, hard (Florida)	To convert number of crabs to weight in pounds, divide by 1.86.
Crabs, hard (Alabama)	To convert number of crabs to weight in pounds, divide by 1.715.
Crabs, hard (Mississippi)	To convert number of crabs to weight in pounds, divide by 1.715.
Crabs, hard (Louisiana)	To convert number of crabs to weight in pounds, divide by 1.86.
Crabs, hard (Texas)	To convert number of crabs to weight in pounds, divide by 1.715.
Crabs, hard (other States)	To convert number of crabs to weight in pounds, divide by 3.
Crabs, king	To convert number of crabs to weight in pounds, multiply by 4.
Crabs, rock	To convert number of crabs to weight in pounds, divide by 3.
Cusk, salted	To convert to fresh-gutted weight, multiply by 1.90.
Haddock, large, salted	To convert to fresh-gutted weight, multiply by 2.06.
Haddock, scrod, salted	To convert to fresh-gutted weight, multiply by 2.10.
Haddock, fresh-gutted, all sizes	To convert to round weight, multiply by 1.25.
Hake, large, salted	To convert to fresh-gutted weight, multiply by 1.90.
Hake, small, salted	To convert to fresh-gutted weight, multiply by 1.98.
Halibut, salted	To convert to fresh-gutted weight, multiply by 2.
Herring, salted	To convert to round weight, multiply by 1.50.
Mackerel, salted	To convert to round weight, multiply by 1.35.
Menhaden	To convert number of fish to weight in pounds, multiply by 0.6.
Oil (east coast)	To convert gallons to pounds, multiply by 7.74.
Oil (west coast)	To convert gallons to pounds, multiply by 7.5.
Pollock, salted	To convert to fresh-gutted weight, multiply by 1.90.
Sponges, dried (Florida):	
Large wool	To convert number of bunches of sponges to weight in pounds, multiply by 2.5.
Small wool	To convert number of bunches of sponges to weight in pounds, multiply by 1.
Glove	To convert number of bunches of sponges to weight in pounds, multiply by 1.5.
Grass	To convert number of bunches of sponges to weight in pounds, multiply by 2.5.
Wire	To convert number of bunches of sponges to weight in pounds, multiply by 1.5.
Yellow	To convert number of bunches of sponges to weight in pounds, multiply by 1.5.

PROGRESS IN BIOLOGICAL INQUIRIES, 1931 [1]

By Elmer Higgins, *Chief, Division of Scientific Inquiry*

[With the collaboration of investigators]

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[1] Appendix III to the Report of the U. S. Commissioner of Fisheries for 1932. Approved for publication, June 16, 1932.

INTRODUCTION

Fisheries biological research by the bureau's division of inquiry respecting food fishes was conducted during the year 1931 under ideal conditions. Not only were funds provided in adequate measure to meet the ordinary needs of the existing organization, but the effects of the economic depression had not yet seriously interfered with the law of supply and demand regulating fishing activities, nor during the early part of the year had it greatly increased the strain upon the fishes of interior waters. Under such circumstances a large staff, functioning with high efficiency, succeeded in collecting great numbers of field observations, which by the end of the year were rapidly being analyzed as a basis for a number of technical reports. All of the major projects under way during 1930 were continued, many of the minor ones were completed, and two entirely new projects of considerable importance were undertaken.

The chief functions of the Bureau of Fisheries are concerned with the conservation of our aquatic resources, yet its operations are different from those of other similar governmental units. Virtually all of the State governments maintain fishery boards, fish and game departments, or conservation commissions, all of which give direct attention to the problems of conservation through regulation of the fisheries by rule or by the enforcement of laws enacted by the State legislatures. Their functions are chiefly administrative, although a few States engage in research as a basis for their regulatory activities. Foreign Governments likewise maintain fishery departments that correspond to our State commissions in their regulatory and administrative functions.

Federal activities in fishery conservation in the United States, however, are of the positive kind, looking toward the development and complete utilization of aquatic resources by means of scientific research and practical fish culture, rather than by negative or restrictive activities such as are involved in the enforcement of regulatory legislation. Except in the Territory of Alaska, the Bureau of Fisheries is without power to regulate fishing, for under the Federal form of government Congress enjoys only such powers as are delegated by the Constitution, and complete jurisdiction of the fisheries has remained in the hands of the individual States. The Bureau of Fisheries is, therefore, essentially a scientific organization; and its findings, presented to the States in the form of technical reports and direct recommendations, become effective only by enactment of the State legislatures. Such recommendations, however, based upon adequate scientific studies and coming from a disinterested and impartial source, are cordially accepted by the States and have great influence in shaping conservation policies insuring the perpetuation of our aquatic resources.

Research activities in the biological sciences are conducted by the technical staff of the division, numbering some 50 permanent research positions, with a score of less trained assistants and perhaps another score of temporary specialists, chiefly from university faculties, who are employed for limited periods of time. These investigators are distributed over the entire country in small groups organized into compact research units, which maintain headquarters either at the bureau's biological or experimental stations or at universities. Only a small administrative staff in the office of the chief of the division is located at Washington, D. C. A half dozen or so investigators whose duties require their location there are accommodated in the new laboratories of the Department of Commerce building.

The scientific projects cover three major fields: Marine and fresh-water commercial fisheries investigations, investigations pertaining to game fishes, and shell-fisheries investigations. Commercial fishery investigations are organized under six distinct sections, each with a responsible technical head. The North Atlantic fishery investigations, directed by O. E. Sette, are conducted from headquarters located at the Harvard Biological Institute, Cambridge, Mass., the Woods Hole Biological Laboratory serving as headquarters during the summer season only. The South Atlantic staff is housed at the Fisheries Biological Laboratory, Beaufort, N. C., under the direction of Dr. H. F. Prytherch. Investigations in the Gulf, directed by Dr. F. W. Weymouth, chiefly concerned with the great shrimp fishery, are conducted from headquarters provided by the Conservation Department of Louisiana at New Orleans. Fishery investigations in interior waters, under Dr. M. M. Ellis, including studies of pollution of the Mississippi River system and the propagation of fresh-water pearl mussels, are facilitated by laboratories provided by the University of Missouri, Columbia, Mo. Great Lakes fishery investigations, directed by Dr. John Van Oosten, are centered at the University of Michigan, Ann Arbor. The staff for the Pacific coast and Alaska fishery investigations, directed by Joseph A. Craig, is housed at the new Fisheries Biological Laboratory, Seattle, which was completed during the past year and is adjacent to the campus of the University of Washington.

Although the division of scientific inquiry conducts no investigations directly concerned with angling, a considerable amount of attention is given to problems of interest to the angler inasmuch as they concern the food and game fishes of interior waters, their culture, distribution, and their planting in depleted or formerly barren waters.

These investigations are of various types. The original distribution and taxonomic distinctions of the Salmonidæ of New England have been investigated by Dr. W. C. Kendall. While the chief investigator in aquiculture, Dr. H. S. Davis, is located in Washington, D. C., studies under his direction in the interest of fish culture, pathology of fishes, fish nutrition, and selective breeding are conducted at the Fisheries Biological Laboratory, Fairport, Iowa, at the experimental trout hatchery, Pittsford, Vt., at the experimental trout and bass station at Leetown, W. Va., and at certain cooperative stations where facilities are provided. Headquarters for trout-cultural investigations and stream surveys conducted by Dr. A. S. Hazzard in the national parks and forests of the Rocky Mountain region are maintained at the University of Utah, Salt Lake City, while California trout investigations carried on by Allan C. Taft are centered at Stanford University.

As a by-product of studies on the life history of fishes in Chesapeake Bay, John C. Pearson produced a popular Fishery Circular on the sport fishing in those waters.

The chief oyster investigator, Dr. Paul S. Galtsoff, is also located in Washington, but field laboratories have been established at Milford, Conn., and a cooperative laboratory for oyster research on Puget Sound is furnished by the State of Washington at Olympia. Research is conducted on the physiology of oysters at the Woods Hole (Mass.) laboratory during the summer months, and the studies on oyster culture in the South Atlantic area are also under the technical supervision of the chief oyster investigator.

Studies of the razor clam in Alaska were conducted independently by investigators temporarily detailed to that work.

During the past year the division has operated a number of vessels, launches, and floating laboratories in the conduct of its scientific investigations. Various phases of the North Atlantic fisheries investigations have required the full time of the *Albatross II*, a 150-foot steam vessel equipped for oceanographic work and experimental trawling. The *Phalarope*, a 110-foot steam yacht, and a chartered power boat in New Jersey have also been employed part time. Fishery studies in Lake Michigan have been prosecuted from the motor ship *Fulmar*, a 102-foot vessel equipped for experimental fishing and limnological studies. An able 38-foot cabin motor cruiser and various smaller launches are stationed at the Beaufort (N. C.) laboratory and two seagoing launches, 45 and 65 feet, respectively, are used by the shrimp investigators of the Gulf. On the Mississippi River two house boats and various launches provide laboratory and collecting facilities, one an 85-foot quarter boat on the lower river houses Doctor Ellis's staff of a dozen coworkers and has a large, well-equipped physiological and chemical laboratory, and another 50 feet long is stationed in the Upper Mississippi Wild Life and Fish Refuge for limnological work. In Alaska a 45-foot launch is used exclusively for herring investigations and various others of the bureau's fleet of vessels are employed as circumstances warrant.

In order to bring before the public certain research activities closely related to the bureau's studies of the Pacific salmon, the work undertaken at odd times during the last 12 years by Dr. Henry B. Ward, of the University of Illinois, should be mentioned. At intervals during the summers since 1918 Doctor Ward has been engaged in research on problems related to the migration of the sockeye salmon supported by funds of the bureau but conducted independently of the division of scientific inquiry.

These studies, while of great interest scientifically, have produced results that promise considerable practical application, especially since the salmon, an anadromous species, is produced in a region where the interests of conservation and hydroelectric power development have been and will continue in violent conflict.

The nature of these studies by Doctor Ward is indicated by the following titles, which are recommended to the critical attention of fishery students and conservationists:

Some features in the migration of the sockeye salmon and their practical significance. Proceedings of the American Fisheries Society for 1920, pp. 387–426.

Some of the factors controlling the migration and spawnings of the Alaska red salmon. Ecology, vol. 2, No. 4, October, 1921.

The influence of a power dam in modifying conditions affecting the migration of salmon. Proceedings of the National Academy of Sciences, vol. 13, No. 12, December, 1927, pp. 827–833.

Further studies on the influence of a power dam in modifying conditions affecting the migration of the salmon. Proceedings of the National Academy of Sciences, vol. 15, No. 1, January, 1929, pp. 56–62.

Some responses of sockeye salmon to environmental influences during fresh-water migration. Annals and Magazine of Natural History, 10th series, vol. 6, No. 31, 1930, pp. 18–36.

The division also maintains contact with the research program of the fisheries of the North Atlantic and progress in biological investigations relating to these fisheries conducted by the various Governments concerned through the annual meetings of the North American Council on Fishery Investigations—an international scientific advisory body composed of representatives of Canada, Newfoundland, France, and the United States. The eighteenth meeting of this organization was held on September 29 and 30, 1931, at Ottawa, at which the United States was represented by the chairman, Dr. Henry B. Bigelow; by Henry O'Malley, Commissioner of Fisheries; and by Elmer Higgins, chief of the division of scientific inquiry.

The division also maintains contact with the research program of the International Passamaquoddy Fisheries Commission, engaged in studies of the Passamaquoddy region, the coastal waters of Maine, and the Bay of Fundy, with special reference to the probable effect upon the fisheries of projected hydroelectric development at the mouth of Passamaquoddy Bay. O. E. Sette, in charge of the division's North Atlantic fishery investigations, is one of the United States commissioners, and a technical advisory committee to the commission includes Dr. Henry B. Bigelow and Prof. A. E. Parr, both of whom are engaged in cooperative researches with the division's staff. Several meetings of this commission during the year have been attended by these gentlemen and on occasion by the chief of the division acting for the Commissioner of Fisheries.

During the year 21 scientific or administrative reports were published under the supervision of the division or as a result of investigations of its staff. The list of papers follows:

Chamberlain, Thomas K.
Annual growth of fresh-water mussels. Bulletin, Vol. XLVI, 1930, pp. 713–739, 20 figs. Document 1103.

Cowles, R. P.
A biological study of the offshore waters of Chesapeake Bay. Bulletin, Vol. XLVI, 1930, pp. 277–381, 16 figs. (graphs only). Document 1091.

Ellis, M. M.
A survey of conditions affecting fisheries in the upper Mississippi River. Fishery Circular No. 5, 18 pp.
Some factors affecting the replacement of the commercial fresh-water mussels. Fishery Circular No. 7, 10 pp.

Ellis, M. M., Amanda D. Merrick, and Marion D. Ellis.
The blood of North American fresh-water mussels under normal and adverse conditions. Bulletin, Vol. XLVI, 1930, pp. 509–542, 14 figs. Document No. 1097.

Federighi, Henry.
Studies on the oyster drill (*Urosalpinx cinerea*, Say). Bulletin, Vol. XLVII, pp. 85–115, 7 figs. Bulletin No. 4.

Galtsoff, Paul S.
Survey of oyster bottoms in Texas. Investigational Report No. 6, 30 pp., 14 figs., 1 map.

Galtsoff, Paul S., and Dorothy V. Whipple.
Oxygen consumption of normal and green oysters. Bulletin, Vol. XLVI, pp. 489–508. Document No. 1094.

GINSBURG, ISAAC.

Juvenile and sex characters of *Evorthodus lyricus* (Fam. Gobiidæ). Bulletin, Vol. XLVII, pp. 117–124, 2 figs. Bulletin No. 5.

GUTSELL, JAMES G.

Natural history of the bay scallop. Bulletin, Vol. XLVI, 1930, pp. 569–632, 32 figs. Document No. 1100.

HIGGINS, ELMER.

Progress in biological inquiries, 1929. Appendix XV, Report, Commissioner of Fisheries, 1929, pp. 1069–1121, 11 figs. Document No. 1096.

Progress in biological inquiries, 1930. Appendix III, Report, Commissioner of Fisheries, 1931, pp. 553–626, 8 figs.

HOPKINS, A. E.

Temperature and shell movements of oysters. Bulletin, Vol. XLVII, pp. 1–14, 10 figs. Bulletin No. 1.

HOPKINS, A. E.

Factors influencing the spawning and setting of oysters in Galveston Bay, Tex. Bulletin, Vol. XLVII, pp. 57–83, 18 figs. Bulletin No. 3.

HOPKINS, A. E., PAUL S. GALTSOFF, and H. C. MCMILLIN.

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PEARSON, J. C.

Sport fishing in Chesapeake Bay. Fishery Circular No. 1, 19 pp., 11 figs.

RICH, WILLIS H., and EDWARD M. BALL.

Statistical review of the Alaska salmon fisheries, part 2: Chignik to Resurrection Bay. Bulletin, Vol. XLVI, 1930, pp. 643–712, 11 figs. Document No. 1102.

ROUNSEFELL, GEORGE A.

Fluctuations in the supply of herring (*Clupea pallasii*) in southeastern Alaska. Bulletin, Vol. XLVII, pp. 15–56, 26 figs. Bulletin No. 2.

SETTE, O. E.

Outlook for the mackerel fishery in 1931. Fishery Circular No. 6, 20 pp., 4 figs.

WEYMOUTH, F. W., and H. C. MCMILLIN.

Relative growth and mortality of the Pacific razor clam (*Siliqua patula*, Dixon) and their bearing on the commercial fishery. Bulletin, Vol. XLVI, 1930, pp. 543–567, 11 figs. Document No. 1099.

WEYMOUTH, F. W., and SETON H. THOMPSON.

The age and growth of the Pacific cockle (*Cardium corbis*, Martyn). Bulletin, Vol. XLVI, 1930, pp. 633–641, 7 figs. Document No. 1101.

In addition to these papers, the following were published by the staff during the past year in other than the bureau's series.

FIRTH, F. E.

A note on spawning rosefish, *Sebastes marinus* L. Copeia, No. 2, p. 65.

Some marine fishes collected recently in New England waters. Bulletin, Boston Society of Natural History, No. 61, pp. 8–14.

Rare fishes from off North Carolina. Copeia, No. 4, p. 162.

GALTSOFF, P. S.

The weight-length relationship of the shells of the Hawaiian pearl oyster, Pinctada sp. American Naturalist, Vol. LXV, pp. 423–433.

Specificity of sexual reaction in the Genus Ostrea. Collecting Net, Vol. VI, pp. 277–278.

HERRINGTON, W. C.

The Bureau of Fisheries haddock investigation. Fishing, Vol. XI, No. 2, pp. 12, 47–49.

KOEHRING, VERA.

Thermal relationships in the neutral-red reaction, 1931. Journal Morphology and Physiology, vol. 52, No. 1, pp. 165–194.

PRYTHERCH, HERBERT F.

The rôle of copper in the setting and metamorphosis of the oyster. Science, April 17, 1931, vol. 73, No. 1894, pp. 429–431.

The U. S. Fisheries Biological Station at Beaufort, N. C. Collecting Net, August 29, 1931, pp. 257–260.

SCHROEDER, W. C.
Notes on certain fishes collected off the New England coast from 1924 to 1930. Bulletin, Boston Society of Natural History, No. 58, pp. 3–8.
An account of the fishes dredged by the *Albatross II* along the continental slope south of New England in February and March, 1929. Copeia, No. 2, pp. 41–46.
SETTE, O. E.
Research ship for the U. S. Bureau of Fisheries. Fishing, Vol. XI, No. 10, pp. 9–11.

In previous reports mention has been made of extensive cooperation in fisheries research by States and other institutions. Such cooperation has been continued, and even extended, to a most gratifying degree during the past year. Not only has official support and encouragement in specific projects been accorded by the States, but active participation, either through the furnishing of considerable funds or by coordinated activities on the part of the research staffs of the individual State fish and game commissions, has been undertaken to such an extent that activities of the bureau's staff have been more effective and extensive than would have been the case otherwise. Such cooperation, which is gratefully acknowledged by the bureau, is in most cases mentioned in connection with the various investigations in the following pages.

The following progress reports covering the more important investigations of the division during the calendar year 1931 were prepared in the main by the investigators in charge of the various projects.

NORTH AND MIDDLE ATLANTIC FISHERY INVESTIGATIONS

Studies of important food fishes of the Atlantic coast north of Cape Hatteras continued during 1931 to obtain much needed information on the effects of natural conditions and commercial exploitation on the abundance of cod, haddock, mackerel, squeteague, scup, butterfish, and winter flounders. The scientific staff has had its headquarters at Cambridge, Mass., where the Museum of Comparative Zoology and the Biological Laboratories of Harvard University have generously provided laboratory and library facilities. This association with the university has facilitated consulation with members of the faculty when advice was needed in special phases of zoology, physiology, chemistry, physics, and oceanography; and specially valuable has been the counsel of Dr. Henry B. Bigelow, professor of oceanography at Harvard University and director of the Woods Hole Oceanographic Institution. The continued cooperation of Prof. A. E. Parr, curator of the Bingham Oceanographic Foundation at Yale University, in directing and conducting studies of the early life histories of fishes along the coast of New Jersey has been an invaluable supplement to the studies of the commercial fisheries of that region. The New York aquarium has also kindly assisted in the work by making collections of young fishes with its station vessel, the *Sea Horse*, and many courtesies have been extended by the Woods Hole Oceanographic Institution and the Marine Biological Laboratory at Woods Hole. The cooperation of these various organizations, the friendly willingness of fishermen to give information on their fishing operations, in some cases expending considerable effort in the keeping of log-book records, and the kindness of fishing companies in putting business records at the disposal of our staff and providing facilities for them on board their vessels and in their shore establishments, which have made possible the progress reported in the following sections, is gratefully acknowledged.

HADDOCK

The investigation of the haddock fishery has been carried on during 1931 by several investigators under the immediate direction of W. C. Herrington.

Statistical and biological studies of the haddock population.—During the past two years the haddock fishery of New England has experienced a sharp decline, following a period of exceptional productiveness. On the fishing grounds, principally Georges Bank and South Channel, where the bulk of the United States landings have originated during the past few years, the abundance of haddock, as measured by the average catch per trawler per day's fishing, increased markedly from 1924 to a maximum in 1927. Since then it has fallen off sharply to a level in 1930 far below that in 1924. This drop continued during the first half of 1931.

The decline beginning in 1928 did not at first seriously affect the fishery. By means of longer trips and fewer days spent in port, the fishing time was increased until it more than compensated for the decreasing abundance, so that the catch per trawler continued to rise. In addition, the total catch was considerably augmented by the increase in the size of the fleet through the construction of new craft. As a result, the total landings continued to increase until 1929, although the catch per day's fishing began to drop during the last part of 1927. By 1930 the level of abundance had fallen to a point where the total catch could no longer be maintained, in spite of increased fishing effort, and there was consequently a decided decrease in total landings in 1930 which continued in 1931.

By combining with the statistical analysis a study of the biology of the haddock stock, primarily size and age composition, growth rate and distribution, the causes of this change in abundance as reflected in the catch per unit of fishing effort are gradually becoming clear. It now appears that between 1920 and 1922 one or more extraordinarily successful haddock year classes were produced. In 1924 the largest of these fish had grown large enough to increase the catch of scrod haddock. In 1925 the full effect of this group was reflected in scrod landings, which were the greatest of any year since 1924, when our detailed records began. In addition, the larger members of this class were then of a sufficient size to be included in the category of "large haddock." In 1926 and 1927 as the full numbers of this enormous group came within the category of "large haddock" and as their total weight increased through growth, the abundance of haddock on the banks, as measured by the number of pounds caught per day's fishing, increased rapidly until a peak was reached in 1927. Since 1927 the catch statistics do not indicate the production of any year class at all comparable in numbers to those of the earlier period. In fact, since 1925 the catch of scrod has become successively less, in 1930 reaching the lowest point on record. Following this, in the latter part of 1931 there was a marked increase in the scrod catch, the cause of which will be discussed later.

The increasingly intensive fishery for "large haddock," combined with the nonappearance of any year class of juveniles comparable to those of 1920–1922 to recruit the ranks, resulted in a rapid decline in the stock of fish which was necessarily reflected in the catch. The staggering nature of this decline is illustrated by records of one large group of trawlers. The average catch per trawler per day's fishing of this group on all banks decreased from about 19,000 pounds in 1927 to about 5,500 pounds in 1930.

It is obvious that there is no reason to expect an increase in the haddock population except through the appearance of numerous young from a successful spawning season, or through the immigration of large numbers from some great reserve stock not now known. The latter is a possibility frequently suggested by those connected with the fishery, but we have as yet obtained no data which in any way support it. Consequently, our hope for the immediate future must lie in the small haddock now present on the banks but still too small for commercial use. It is these fish which will determine the trend of the fishery during the next several years.

Work carried on during the past year, both at sea and on shore, has shown that there is now present on the banks a group of small haddock forming the most numerous year class which has appeared during the past several years. In the latter part of 1931 the largest individuals of this group were of sufficient size to be used as scrod, and their presence was reflected in the commercial catch by a remarkable increase in the scrod landings during the latter part of the year. By the summer of 1932 the main part of this class should be of scrod size and by the following summer the majority should qualify as "large haddock." But this will vary considerably on different banks according to the growth rate of the fish in different regions. On Browns and Western Banks this group appears to be present in considerable numbers; but due to a slower growth rate, the fish are of smaller size and consequently will not affect the commercial catch until later.

At present we are in no position to predict how far this influx of young haddock will go in restoring the fishery to the abundance of the past few years. Before such forecasts are possible it will be necessary to follow several groups through their life span in the commercial fishery to determine what effect a year class of a given abundance will have on the commercial catch over the period of years through which it is subject to the fishery. It seems safe to predict, however, from our present data, that the catch of scrod per day's fishing should continue at a high level during 1932, while there will be no permanent improvement in the catch of "large haddock" until the present scrod class reaches a sufficient size to qualify as such. On Georges Bank this should take place during the fall of 1932 and spring and summer of 1933, though some effect may be felt in the catch of "large" as early as the summer of 1932, especially in the Channel region.

It should be remembered, however, that the present fleet is larger than that which was operating when the 1920–1922 group was of scrod size. It is possible that the destructive effect of the larger fleet may prevent the current group from attaining great importance, even if it was originally as numerous as the 1920–1922 broods.

Savings-gear work.—That there has been wholesale destruction of small fish by the gear now in use by the otter and V–D trawl fleet has long been known. Extensive records collected in 1915 and 1931 show that in those years from one-half to two-thirds of the haddock (in numbers) caught by these vessels were too small for commercial use. Similar damage was wrought among the young of other species. In the course of a year's time the aggregate number of small fish killed by this method of fishing was enormous.

A study of the problem was begun in 1931, when the haddock work began, and later tests were made of several types of experimental savings gear designed to permit the escape of fish too small for commercial use. The primary object of the experiments was to develop modifications of the commercial gear which would allow the escape of undersized fish without introducing complications that would make the gear unacceptable to the fishermen.

Except for some preliminary work at Woods Hole and on the *Albatross II*, the field work has been performed on board commercial vessels. This has made it very desirable to use a method of testing the experimental gear which would interfere with the fishing operations as little as possible. The trouser trawl was found to fit these requirements and gave very satisfactory results. The trouser trawl used consisted of a commercial otter trawl divided up the middle by a partition and with two cod-ends. The gear to be tested was placed on one leg of the trawl and the standard gear on the other.

The trouser trawl was used for preliminary tests to determine the size and mesh and type of construction necessary to permit the escape of undersized fish with no loss of marketable ones. These results were then utilized in the construction of a commercial savings cod-end. Considerable difficulty was encountered in making this gear sufficiently rugged to compare in durability with the present commercial gear on the rough bottom now being fished. A cod-end is being tested which has so far given satisfactory results. The general design is as follows:

The bottom of the cod-end is made of the same netting used in the present commercial gear. For the large boats this usually is 4-thread No. 900 manila twine doubled. The mesh measures 3–3½ inches between knot centers, stretched mesh. The taper on the top of the cod-end and 3 inches of the netting on the lower end of the top is of the same mesh as the bottom. The piece between the taper and lower end section is of 4-thread No. 750 manila twine doubled and 5-inch stretched mesh, and is knitted onto the small mesh at the upper and lower ends, taking up two small to one large mesh. The piece of large mesh is made about 20 per cent longer than the corresponding section on the bottom of the cod-end. This gives approximately the same area of netting on top and bottom and helps to keep the large top mesh open when there is anything in the cod-end. The small-meshed piece at the lower end of the cod-end top also gives additional strength to this section, where the chief strain comes in swinging the catch inboard; and if one strand is cut, no appreciable amount of the catch is lost.

On one trip to Western Bank a commercial trawl with this type of cod-end was fished alternately with a similar trawl using a commercial cod-end. It was found that with an equal catch of large haddock but one-fifth as many undersized ones were taken. The numbers of undersized fish of other species were reduced in proportion. Tests of this type of cod-end are being continued, and several improvements are being developed.

The gear experiments conducted by the bureau have been greatly facilitated through the cooperation of a number of commercial concerns. The Linen Thread Co., of Boston, Mass., and the Plymouth Cordage Co., of Plymouth, Mass., furnished much of the material and made up most of the experimental gear. Lloyd Runkle, of the former company, assisted on several field trips and had charge of constructing the experimental gear. Later in the work several commercial models were constructed by the Portland Trawling Co. in their net loft at Groton, Conn. Except for some preliminary work on the *Albatross II*, the field trials were conducted on the schooner *Exeter* and steamer *Kingfisher* through the generous cooperation of the General Sea Foods Corporation and Portland Trawling Co.

Early-life history.—Material has been collected during the past year concerning the location and extent of spawning areas and the movements of the eggs and larvæ during the period when they drift passively with the current. This material is used for the study of the interdependence of the various banks for their replacement of small haddock, and the causes of success or failure in the production of the different year classes.

During the haddock-spawning season in the spring of 1931 three trips were made on the *Albatross II*, each of about two weeks' duration, and covering a grid of 40 stations, spaced at 32-mile intervals each way, extending over the area from west of Nantucket Shoals to Browns Bank. At each station from one to four tow-net hauls were made, depending on the depth, using 1-meter silk nets and a Welsh trawl. The sorting and analysis of the collections have not progressed far enough to report results.

Hydrographic data, such as water samples and temperatures, were obtained at each station for the various depths, and on the last two trips 800 drift bottles were released, 10 to each station on each trip. The drift bottles were colored a brilliant yellow, a color which tests had shown to be most conspicuous under the conditions encountered. The returns from this work have been exceptionally numerous and have given us a much better conception of the surface currents in the Georges Bank region.

MACKEREL

The mackerel is prominent among the important food fishes of the Atlantic coast, not only for the magnitude of the annual catch, which in recent years has averaged around 40,000,000 pounds annually, but also for the extreme fluctuations in abundance which have characterized this species ever since records on this fishery were first kept, early in the nineteenth century. The objective of the bureau's investigations of this species is to ascertain the nature and causes of these changes in abundance, to determine whether they may be affected by man's inroads on the stock in the sea, or whether they are due to natural causes beyond his control of such nature that they may be foreseen and turned to advantage by appropriate adjustments in the fishery.

The work to date has shown that the changes in abundance have been due primarily to the variable number of mackerel added to the stock by each year's spawning. This probably is because conditions for survival of the very young are much better in some years than in others, so that sometimes many mackerel grow to commercial size, while in other years very few survive the first weeks or months of existence. In years of good survival so many mackerel are added to the stock that a period of plenty ensues; and, conversely, during a series of years when survival is poor, so few are added that a period of scarcity follows.

This working knowledge of the mechanism of fluctuations has been attained gradually through seven years of close observations on the volume and age composition of the market landings of mackerel and from periodic surveys of the spawning and nursery grounds of the species by the bureau's fishery research vessel *Albatross II*.

The investigations were continued during 1931 under the direction of Oscar E. Sette. The data on market landings were collected mainly at New York during May and June, at Boston from June to October, and at Gloucester during November and December. These were augmented by observations at Cape May during April, at Newport during May and June, at Woods Hole from May to October, and during the summer at various minor ports in the Middle Atlantic region.

During the year the fleet landed 3,056 fares of mackerel, aggregating 36,490,847 pounds. By interviewing the masters of fishing vessels the date, locality, and quantity caught were ascertained for 1,329 fares, and samples of mackerel were measured from 856 fares. These, together with 10,883 mackerel measured from the pound net fishery, made a total of 35,068 measurements for the season. Scale samples were taken from 1,280 mackerel. Many mackerel-vessel captains continued to cooperate by keeping detailed logs of their activities. Thanks to the kindness of the Atlantic Biological Station, St. Andrews, New Brunswick, Canada, 26 samples, affording 2,623 measurements of gill-net and trap mackerel, were collected at Pennant, Nova Scotia.

The 1931 work has supplemented our previous understanding of mackerel fluctuations in numerous respects, but perhaps the most striking evidence of the approach to thorough knowledge is the gratifying outcome of the forecast on probable abundance during 1931.[2] Before discussing this subject in detail, it should be explained that the fishery draws mainly on the mackerel that are 2 years of age or older. Mackerel younger than this weigh less than a pound, are delicate, spoil readily, and can not compete in the open market with the larger and more desirable mackerel. They usually are sold in a separate category known to the trade as blinks and tinkers. Because of the peculiar combination of economic and biological conditions that influence the catch of these small mackerel, and because of the difficulties of getting a measure of abundance of young mackerel before they are large enough to be caught commercially, the forecast was limited to the sizes larger than blinks or tinkers. In the forecast it was estimated that the abundance of mackerel would be such as to produce a catch of 35,000,000 pounds exclusive of yearlings (provided the fishing was approximately as intensive as in the previous year). Actually, the 1931 catch slightly exceeded 32,000,000 pounds, exclusive of yearlings. Thus the forecast was within 7 per cent of the realization. There has not yet been opportunity to analyze the statistics, but we are under the impression that the fleet was approximately the same size and as active as in the previous year. When it is recalled that the catch of mackerel is sometimes subject to fluctuations of the order of 50 or 100 per cent, the closeness of the prediction may be appreciated.

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[2] Outlook for the mackerel fishery in 1931. By Oscar E. Sette, Bureau of Fisheries, Fishery Circular No. 4, August, 1931 (approved for publication May 26, 1931).

The satisfactory outcome of the 1931 prediction must not be received as an indication that forecasting is established on a sound basis; on the contrary, there are elements in the behavior of various contingents of mackerel which may easily prove disconcerting in future predictions. For instance, the 1928 class of mackerel appears to have had a much higher loss rate than the 1923 class at a similar age. It remains to be determined whether this was due, in fact, to a difference in death rate or to an artifact traceable to a more intensive fishery at one time than the other. There is also the additional possibility that neither was the case, for the same effect might be produced by an intrinsic difference in the habits of the 2-year classes which might render them susceptible to larger catches at one stage of their life history than at another. A notable difference in the areas frequented by these year classes strongly hints at this possibility. Continued observations and more intensive analysis of the data are in order.

An equally serious weakness in the observations from the standpoint of forecasting methods is the inability to get a measure of abundance before a year class is first old enough to be an important component of the commercial catch. This difficulty may be overcome by discovering the cause of variations in the size of the year classes so as to estimate the abundance independently of the commercial fishery, and in advance of the earliest exploitation. To this end the fisheries-research steamer, *Albatross II*, has periodically cruised the spawning and nursery areas of the mackerel in order to collect data as to the abundance of the eggs and young stages, and as to the physical, chemical, and biological conditions in the environment which might have an influence on the number surviving the hazards of their early existence. While it is yet too early for conclusive results, differences in the abundance of late larval stages have been discovered that may prove useful to indicate the numerical strength of the year classes. Particularly noteworthy was the widespread presence of late larvæ in 1931, the significance of which will be established when these mackerel become of commercial size in 1932 and 1933.

The work on the spawning grounds should not only aid in arriving at more reliable forecasts but should also provide information as to the conditions that control the production of successful year classes. This is a question of fundamental importance in fisheries science, and its answer would be of inestimable value to the solution of fishery problems.

To provide data for the interpretation of findings on the mackerel-spawning grounds, with special reference to the influence of ocean drifts in transporting fish eggs and larvæ, experiments on the rate of development of mackerel eggs were carried out by Leonard G. Worley during the spring of 1931. He found that the eggs of this species hatched in 6½ days at 11° C. and 2 days at 21° C., with corresponding incubation periods for intermediate temperatures. In addition, it was found that the limits of successful hatching were between 10° C. and 22° C., with the maximum percentage hatching at 16° C.

COD

Studies of the migratory habits and other phases in the life history of the cod were continued by William C. Schroeder during 1931, though field work was limited by the requirement of personnel and vessels on other projects. Marking experiments were made in the following localities: (*a*) Woods Hole, Mass., January 8–9; (*b*) Nantucket Shoals, August 10–11; and (*c*) Mount Desert, Me., June 21–29.

The results in general resembled those of the preceding years, corroborating earlier conclusions that many of the cod which summer off southern Massachusetts migrate westward in the fall to winter off Rhode Island and the Middle Atlantic States region, but that the shore cod of eastern Maine remain for the most part localized, a few of them moving north and east to Nova Scotia.

A total of 45,452 cod was tagged at sea from 1923 to 1931, of which 3,204, or about 7 per cent, were reported recaptured, the returns from some lots of fish being as low as 1 per cent, while from others they have been as high as 35 per cent. In addition, 2,223 cod were tagged and liberated at the Woods Hole fisheries station from 1926 to 1931, of which about 3¼ per cent were reported recaptured.

A new type of tag made of two small, thin celluloid disks, resembling the Scottish plaice label, was devised by R. A. Nesbit in connection with his study of tagging methods useful for Middle Atlantic fishes. This celluloid tag was used for tagging cod during 1930 in place of the metal-strap tag employed in previous experiments; and although but little more than a year has elapsed, it gives promise of being much more efficient than the old one. For example: Whereas only about 3 per cent of the Monel-metal tags were recovered the first year from cod tagged on Nantucket Shoals during 1923–1929, the returns from the celluloid tags used in that locality in October, 1930, amount to 15 per cent for the succeeding 12-month period. While these favorable returns demonstrate the superiority of the new style tags during the first year of release, it still remains to be seen whether they persist during later years.

The results so far obtained from this new disk tag make it desirable to continue cod-marking experiments on the prolific offshore grounds, from which only meager data have been obtained; chiefly, perhaps, because of the inefficiency of the metal-strap tag. An important objective is determination of the sources of replenishment for the stocks of commercial-sized cod on the offshore banks—especially whether these grounds are self-supporting or whether they depend in a large measure on immigration of juveniles and adults from other grounds. The continued marking of 1, 2, and 3 year old fish in the shore waters along the coast of Maine, an important nursery for young cod, is expected to throw some light on this question. In past experiments in this region the marked fish have been rapidly caught up by local fishermen and the tags were seldom carried by the fish for more than a year. However, by marking in localities not ordinarily visited by fishermen and by using improved types of tags it is hoped to trace the migration of these young fish when they become older and move offshore.

WINTER FLOUNDER

As mentioned in the previous annual report, such concern has been felt over the welfare of the flounder fishery that certain waters have been closed by State law to flounder draggers during a portion of the season. A comprehensive investigation is therefore urgently needed to determine whether in fact this species is being overfished; and, if so, what practical methods of conservation should be adopted. Though the means for such an investigation have not been available to the bureau, a limited program was begun in 1931 that throws some light on the pertinent question of whether the winter flounder *Pseudopleuronectes americanus*, migrates widely from place to place or whether the various grounds have separate, self-perpetuating populations. In the one case overfishing at any one place would reduce the population at other places also. In the other case the effects of overfishing would be felt only in the locality in which it occurred. Obviously, this information is a preliminary necessity for an understanding of the ability of the species to support the commercial fishery and for designing protective measures if such be needed.

In Waquoit Bay, near the United States Fisheries Biological Station, Woods Hole, Mass., a concentration of winter flounders regularly occurs, many of which are spawning fish. Mixed with the spawners are juveniles, immatures, and spent individuals. During the period from February 13 to April 3, 1931, 4,179 flounders, both young and old, were tagged and released. The work was done by Robert A. Goffin and Henry M. Bearse under Robert A. Nesbit's supervision. The tag used was similar to the Scottish plaice label, consisting of two celluloid disks held together by nickel wire passed through their centers. About half of the flounders were tagged just below the dorsal fin immediately posterior to the head; the remainder at a similar point midway between snout and tail.

Returns to December 31, 1931, totaled 84 fish, exclusive of 56 which were taken by the hatchery's fishing crew within 40 days of the time of tagging and again released. These recaptures show that there is a definite movement of flounders in spring toward offshore waters, mostly eastward through Nantucket Sound, but with a few straying westward through Buzzards Bay or Vineyard Sound. By summer time tagged fish were recaptured for the most part in the open waters both north and south of the mouth of Nantucket Sound. A few returns were from the shores of Long Island, some 150 miles to the westward of the tagging locality. In the autumn returns were reported from the sounds, and by December several were recaptured in Waquoit Bay, where they had been caught and tagged nearly a year previously.

SHORE FISHES OF THE MIDDLE ATLANTIC STATES

Investigation of the causes of fluctuations in yield of the shore fishes of the Middle Atlantic States, begun in 1927, was continued under the direction of R. A. Nesbit. Field bases were maintained during part or all of the 1931 fishing season at Woods Hole, Mass.; Newport, R. I.; Montauk and Fire Island, N. Y.; and Belford, Long Branch, Deal, Seaside Park, Beach Haven, and Wildwood, N. J. At these bases the principal data obtained were detailed records of the catch, with length-frequency observations of the principal species occurring in the region (squeteague, scup, butterfish, sea bass, and summer flounders) and the collection of squeteague scales.

Squeteague.—Especial attention has been paid to analysis of the data pertaining to squeteague, this being the most important species of the region, the yield of which in New York has recently been so low as to cause concern. Procedure in 1931 was directed toward determining whether the stock of squeteague north of Delaware is self-perpetuating or whether it is maintained by migration of fish from southern waters. One thousand four hundred and ninety-three squeteague, mostly yearlings, were tagged by W. C. Schroeder in Chesapeake Bay during October, 1931, with the expectation that should any general northern migration of these yearlings occur in 1932, they should be recaptured in the New Jersey and New York region. A second line of procedure consisted of careful studies of the scales to determine whether squeteague from different localities show significantly different rates of growth. Remarkable differences between the growth increment of the third and subsequent summers were noted in fish from different localities. Thus, the average third summer increment for squeteague at Montauk, N. Y., was three times that at Wildwood, N. J. Calculated increments for the first and second summers for fish taken in New York and New Jersey in their third and subsequent summers are in good agreement with the corresponding increments observed in Virginia fish. These observations indicate that northern stocks of adult squeteague are in part at least recruited from southern nursery grounds, but final judgment will depend on the results of tagging experiments.

The scale studies on which the calculations of growth rates were based have cast much light on the forming of the annulus or year mark. It was noted by Taylor that the annuli in the squeteague scale became apparent in July. Our observations have shown that the first annulus usually appears before the fish becomes sexually mature; hence it seems unlikely that the check is caused by the effort of spawning. Comparison of scale length with age length by months indicates that the scale ceases to grow about the first of October, although the body continues to do so. Scale growth is not resumed until the following July. As the annulus can not be seen until new growth has begun, an annulus which really was formed in October appears to be formed in July. When the scale resumes growth it does not regain the ground lost during its period of inactivity. Consequently, the average scale length of old fish is less than that of younger fish of the same size.

Reexamination of published observations on rate of growth of herring and young cod scales relative to that of the body discloses a similar situation, with the important exception that in these species the summer growth more than compensates for the period of winter inactivity, so that the net result is a gain in scale length relative to that of the body. These facts undoubtedly are an important factor in causing the distortions which have resulted from attempts to calculate growth increments from scales.

Scup.—The yield of scup has been subject to wide fluctuations during the past 40 years both in New York and in New Jersey. The record since 1921, covering the period of a significant increase in yield from pound nets, is more complete for New Jersey than for New York. Hence the present discussion will be limited to consideration of fluctuations in New Jersey and their causes.

The pound-net yield, as indicated by periodic canvasses, shows low levels of abundance during the period from 1890 to 1908, followed by increases in 1917 and 1921. In 1926, however, the catches again declined to a level only slightly higher than that of 1908. In 1929 a notable increase occurred, the total pound-net catch for New Jersey rising to the highest figure since 1921. This level was well maintained in 1930 and 1931.

Compilation and study by W. C. Neville of the data on lengths of scup collected from commercial catches from 1928 to 1931 show that the sudden increase in the scup catch during 1929 was due to the influx of an abundant brood produced in 1927, which first reached commercial size in 1929. In 1928 this group was heavily represented in the catches sampled, but as the fish were below legal size they had no effect on the reported yield.

When they reappeared in large numbers in 1929 they were salable, and raised the reported yield to record figures. But continuation of high pound-net yields in 1930 and 1931 was due only in part to the continued presence of the 1927 brood, for the 1928 brood was also large and served to offset the diminution in the numbers of 1927 fish returning in these years.

It is to be noted that both the 1927 and 1928 broods were produced in years in which the pound-net yield was at a low ebb. If the pound-net yield constitutes a reliable index of actual abundance of scup, it might be inferred that even a greatly reduced stock is capable of producing sufficient numbers of eggs to restore high levels of abundance, provided conditions for development are favorable.

That this is not necessarily the case is indicated by data from the offshore fishery during the past few years. In 1928 otter trawlers, purse seiners, and offshore pounds located on Five Fathom Bank took fair numbers of larger and older scup than those which made up the scanty inshore pound-net catch of that year. In 1929, when large catches of scup of the 1927 brood were made inshore, the offshore fishing took few of these, depending, as in 1928, on a stock of older and larger fish than those found inshore. In 1930, and to a greater extent in 1931, the 1927 brood began to affect the offshore yield, coincident with lessened importance in the inshore catch.

It thus appears that on reaching commercial size, scup first are taken by the inshore pounds. As they become older and larger they are no longer available to this gear, but are taken by the offshore fishery.

In view of the complete recovery of the fishery in 1929 and subsequent maintenance of satisfactory yields it is apparent that the scup is not in need of protection from the fishery as carried on prior to 1929, for the offshore fishery was of such small proportions that it took only a small toll from the spawning reserve of large adults which escaped the pound net fishery.

Since 1929, however, two important changes in the fishery necessitate careful reexamination of the capacity of the scup to withstand the strain imposed. The first is a rapid expansion of the offshore otter-trawl fishery during the summer, and the second the rapid growth of a winter-trawl fishery (2,000,000 pounds were landed in 1930–31). Although this fishery is conducted in southern waters, there is a possibility that it takes toll of a stock drawn from the summer population of the whole Middle Atlantic region.

The increased summer-trawl fishery and possibly the winter fishery have increased the toll taken from the stock of older fish previously protected from man and available as a spawning reserve. Just what the minimum size of the scup population need be in order to maintain an adequate spawning reserve is an open question. Although it has been shown that the 1927 and 1928 broods were the result of a spawning population that certainly was not taken in large commercial quantities by the inshore pound nets in these years, there still remains the probability that these broods may have resulted from the spawning activity of the larger offshore fish, the existence of which was not realized prior to the growth of the offshore-trawl fishery.

Thus the principal threat to the welfare of this fishery is the possibility that the spawning reserve may be reduced beyond safe limits. In order to determine whether this is the case it is planned to:

(1) Observe rate of decline of important broods as shown by catch records and continued length data.

(2) Estimate the fishing strain from recapture of scup tagged at appropriate points. The tagging program will also serve to indicate the extent to which the winter fishery imposes an additional strain on the scup population of the Middle Atlantic States. This project was begun in 1931 by the tagging of 1,000 scup at Woods Hole, and 1,500 at a number of points between Cape May, N. J., and Cape Charles, Va. Additional tagging will be done off the Virginia coast during the winter of 1931–32.

Utilization of any surplus in excess of spawning needs is desirable, otherwise the more valuable commercial sizes would be wasted; but pending the outcome of the investigation described above, no restriction of the fishery is recommended.

Butterfish.—In the early years of the Middle Atlantic fisheries the butterfish, like the whiting to-day, was incompletely utilized. At present, however, the demand is ordinarily sufficient to insure profitable sale of all that are taken. It has become one of the mainstays of the pound-net fishery. In view of its present importance it is desirable to determine whether it is in need of protection to insure continuation of satisfactory yields.

Analysis by H. M. Bearse of length-frequency data for three years, coupled with the results obtained from study of the catch records, has shown that the abundance of butterfish is definitely related to variations in success of reproduction from year to year. The New Jersey State records and the individual pound-net company records show an unusually good catch per unit of gear for the year 1929. The length frequencies for the year 1928 demonstrate the presence of a group of small and medium fish dominating the catches at most points along the coast; those for 1929, a group of medium and large fish appearing in overwhelming numbers; and those of 1930, dominated by large fish. From the consistent behavior of the size variations for the three years it is clear that the catches during that period have been made up largely of fish resulting from a single spawning, presumably that of 1926.

The effect of this large brood was to increase the total catch of butterfish as well as the catch per unit of gear for the season of 1929 in New Jersey. Although a large proportion of the fish taken by pound nets in 1928 and 1930 was of the same brood as those taken in 1929, the yields for these years were moderate. In 1928, however, these fish were for the most part too small to be salable, and the majority of those taken did not enter into the recorded catch. The decline in 1930 probably was due either to natural mortality and to the fishing, or to a change in habits with age similar to that described for the scup. No evidence on this point is available, as few butterfish are taken by gear other than pound nets.

It appears, therefore, that the restoration to nearly record levels in 1929 without protection demonstrates the ability of the butterfish to withstand the strain of the fishery, unless unforeseen developments should increase the exploitation of this species.

Early-life histories.—Studies of spawning and nursery grounds of Middle Atlantic fishes were continued under the able direction of Prof. A. E. Parr, curator of the Bingham Oceanographic Foundation, Yale University. The work which began in Delaware Bay in 1929 was continued in 1931 and extended to Barnegat Bay and Sandy Hook Bay. Many data bearing on the abundance and rate of growth of young squeteague, scup, spot, and sea bass were collected.

Of special interest is the observation that the presence of even very small juveniles in a locality does not necessarily imply successful local reproduction. This is illustrated by two species—the mullet, *Mugil cephalus*, and the spot, *Leiostomus xanthurus*. The former species does not spawn in New Jersey; in fact, it is doubtful whether the adults occur there at any time; yet juveniles are common. Juveniles of the spot, less than an inch in length, appear along the shores of New Jersey and New York. Since this species spawns in winter when neither adults nor larvæ occur north of the mouth of Chesapeake Bay, these juveniles can not have resulted from local spawning; but they must have migrated from localities well to the south, perhaps in part from North Carolina waters. While they are in

New Jersey, young spot grow more rapidly than those which remain in the South.

The interdependence of northern and southern stocks of spot is further evidenced by facts pointing toward a southward migration of young spot in the autumn, for their disappearance at that season from New Jersey waters is accompanied by a sudden increase in average length of the stock of spot in North Carolina, due doubtless to the addition of the faster-growing northern spot to the North Carolina population. This view is supported by the winter recapture in North Carolina of a young spot which had been tagged in New Jersey the previous October.

As in 1929 and 1930, large collections of squeteague eggs were made in June, 1931, near the mouth of Delaware Bay, but no larvæ were taken. Although numerous juveniles were taken subsequently, they appeared too late to have resulted from the spawning noted. It remains an open question whether these juveniles resulted from local spawning which escaped observation or whether they, like the spot, migrated while still very small from the southern grounds where larvæ as well as eggs have been captured.

OCEANOGRAPHIC STUDIES

As more and more of the fluctuations of our fisheries are traced to variations from year to year in the survival of the early stages of various species, the discovery of the causes of this variation becomes more and more urgent. This involves a greater understanding of oceanographical conditions than has yet been attained. Although the bureau does not have the means to enter into this field at present, it has been fortunate in having the study of the physical oceanography and the plankton of the waters overlying the continental shelf between Cape Cod and Cape Hatteras undertaken by Dr. Henry B. Bigelow, director of the Woods Hole Oceanographic Institution, and Mary Sears.

Much of the material necessary for this study has been accumulated on cruises made by the *Albatross II* in that area for investigation of the spawning of the mackerel. Additional data and collections are being secured by the research ship *Atlantis* of the Woods Hole Oceanographic Institution to supplement collections already made.

A résumé of oceanographic work done by the *Albatross II* during 1931 appears in the accompanying table.

TABLE 1.—*Summary of offshore oceanographical work done in conjunction with cod, haddock, mackerel, and shore-fish investigations, 1931*

Date	Station numbers [1]	General locality	Number of stations occupied	Temperature and salinity observations	Collections made			
				Serials, surface to bottom	Phytoplankton surface horizontal	Zooplankton oblique	Welsh trawl	Otter trawl
Feb. 13–14	20877–20883	Massachusetts Bay and Georges Bank.	7	7	6	11	------	------
Feb. 17–Mar. 5	20884–20922	No Mans Land, Mass. to Ocracoke Inlet, N. C.	39	39	7	[2] 37	------	[3] 27
Mar. 19–31	20923–20963	Georges Bank and Nantucket Shoals	41	41	41	84	3	------
Apr. 16–29	20964–21003	do	40	40	39	83	8	[3] 8
May 16–22	21004–21038	No Mans Land, Mass. to Assateague, Va.	35	35	35	66	11	------
May 26–June 9	21039–21075	Georges Bank and Nantucket Shoals	37	37	37	80	22	------
June 12–19	21076–21116	Cape Cod Bay to Chesapeake Bay.	41	41	41	89	21	------
July 7–16	21117–21152	Cape Cod Bay to Barnegat, N. J.	36	36	36	79	30	------
July 24–28	21153–21180	Gulf of Maine	28	1	------	3	------	[4] 28
Aug. 9–11	21181–21195	Nantucket Shoals	15	15	------	------	------	[4] 1
Aug. 27	21196–21199	Offing of Chatham, Mass.	4	4	4	13	4	------
Aug. 31–Sept. 9	21200–21233	Montauk Point, N. Y. to Browns Bank.	34	[5] 34	------	------	------	[3] 39
		Total	357	330	244	545	99	103

[1] Albatross series.
[2] Includes 9 horizontal zooplankton hauls at the surface.
[3] 60-foot otter trawl.
[4] 35-foot otter trawl.
[5] Temperatures only.

EXPERIMENTAL REARING OF FISH LARVÆ

As discussed in previous sections, many of the fluctuations in yield of our food fishes are due to variations in the success of various year classes pointing to critical stages in the early life history of the species. Studies on oceanic conditions may reveal the causes for excessive mortality in some years and nominal losses in others; but the probability of ascertaining them might be enhanced greatly if it were known what conditions of temperature, salinity, light, and other physical and chemical properties are favorable to survival of the newly hatched young of fishes, and what food materials must be provided.

Generally speaking, it has been impossible to rear the newly hatched young of marine species of fish under laboratory conditions. However, in the summer of 1929 and 1930 Louella E. Cable succeeded in rearing several fish through the larval stages in the Beaufort (N. C.) laboratory and in 1931 conducted experiments at the

Woods Hole (Mass.) station. While the larvæ were not carried through the entire critical period, the work was successful in prolonging life somewhat beyond the normal period experienced by larvæ under the artificial conditions necessary in the laboratory, and there were revealed encouraging leads for future experimentation.

CHESAPEAKE BAY INVESTIGATIONS

After completing certain phases of investigations in the Chesapeake Bay region, a long-needed study of the life history of the striped bass, *Roccus lineatus*, in Maryland and Virginia waters was undertaken by John C. Pearson.

A study of the seasonal distribution and abundance of pelagic marine fish eggs and young fishes at the entrance to Chesapeake Bay was completed and a report submitted for publication. Besides showing the seasonal occurrence of at least 40 species of pelagic young marine fish and the location of the spawning grounds of the squeteague or gray sea trout in the Chesapeake Bay region, the investigation added to our knowledge of the life histories of many valuable food fishes, such as the gray sea trout, butterfish, harvest fish, and bluefish.

An investigation of the winter-trawl fishery off the Virginia and North Carolina coast during the winter of 1930–31 disclosed the rise of an important fishery in the South. The total yield of this fishery for the season approximated 5,600,000 pounds, valued at more than $600,000 to the fishermen. Nearly 50 trawlers engaged in the fishery, about half of this number coming from New Jersey, Massachusetts, and other northern fishing ports. Scup, croakers, summer flounders, sea bass, hake, and gray sea trout composed the bulk of the catch, although nearly all of the principal food fishes of the North, Middle, and South Atlantic States were represented. This fishery has furnished material for a paper entitled "The winter-trawl fishery off the Virginia and North Carolina coasts."

In the spring of 1931 a study was commenced to ascertain the major features of the life history of the striped bass in Chesapeake Bay. The striped bass supports one of the most valuable of Maryland's marine and fresh-water fisheries, ranking as the third most valuable food fish in price per pound in the United States. The striped bass is not only one of the leading food fishes, but it has become a leading sport fish both on the Atlantic and Pacific coasts.

The investigation of the species in Chesapeake Bay during the first year has consisted largely of migration studies. Interesting and significant results from tagging experiments are indicated. Spawning areas, rate of growth, and conservation requirements of the species will be studied during the coming year.

SOUTH ATLANTIC AND GULF FISHERIES INVESTIGATIONS

The investigations of fishery problems in the South Atlantic and Gulf States include studies of the shrimp fisheries from North Carolina to Texas, studies in oyster culture in the States of North Carolina, South Carolina, Georgia, and Florida, and ichthyological studies of the fish fauna of the Gulf coast. In addition to these, various activities at the Fisheries Biological Station, Beaufort, N. C., have general application to the fisheries of that region. Inasmuch as this laboratory is in operation throughout the year, the investigations conducted there during 1931 are discussed in a later section.

Red-snapper investigation.—In response to a request to investigate an alleged shortage of red snappers in the Gulf of Mexico and to offer suggestions for increasing the catch of fish in that region, William C. Schroeder was detailed to Pensacola from October 13 to November 2. Since the work was limited to several weeks' investigation of the Gulf's snapper fisheries, it could not be determined whether the stock of fish had suffered depletion, but it was evident that the present low yield might be materially increased by greater expenditure of effort on the part of the fishermen. Trawl-line gear such as is used off the New England coast was tried with some measure of success by using floats to keep it clear of coral, and it appears probable that Gulf of Mexico fishermen could make use of this gear in addition to hand lining, which at present is the only method used for catching ground fish in that region. It is desirable also that soundings be made in the Gulf, especially between about 30 and 120 fathoms and within about 150 miles of Pensacola, to learn whether any new fishing grounds exist within convenient distance of the local fleet.

SHRIMP

Since 1880 the production of shrimp has been increasing at a uniform rate, doubling itself about every 8½ years, until in 1930 canned shrimp ranked as the fourth most valuable fishery product in the United States, including Alaska. This rapid increase in the fishery caused great anxiety for the future of the industry and resulted in many requests for a complete study of the problem. With the increased funds made available after the passage of the 5-year program bill, the Bureau of Fisheries was enabled to undertake an extensive investigation of the abundance and life history of the shrimp. As recorded in the report of last year, Dr. F. W. Weymouth, professor of physiology of Stanford University, Calif., was chosen to supervise the investigation.

In February, 1931, the chief of the division of inquiry, accompanied by Doctor Weymouth and Milton J. Lindner, formerly with the State Fisheries Laboratory of California, visited the chief shrimp ports for a brief survey of the state of the fishery.

The initial step of the investigators was to arrange the details of cooperation which had been offered by the various States in which shrimping is prosecuted. As this fishery extends over more than 3,000 miles of coast line, it was deemed necessary to cooperate with as many States as possible in order to obtain the most complete information with the limited funds available. Through the foresight of Commissioner Peter S. Twitty, Georgia had inaugurated investigations early in September, 1930, at Brunswick, Ga., to observe the fishery.

Louisiana, the center of the shrimp industry, offered to join the Bureau of Fisheries in a joint program. Commissioner Robert S. Maestri appointed J. N. Gowanloch to head the staff of the newly created bureau of research and statistics to cooperate in this investigation. Through the courtesy of the department of conservation, offices for the joint staff were obtained in New Orleans, and a boat furnished by the bureau was refitted by the State and placed at the disposal of the investigators. Later Texas, through William J. Tucker, executive secretary of the game, fish, and oyster commission, expressed a desire to cooperate in the investigation. An investigator was employed and stationed at Aransas Pass, Tex., to conduct observations on the commercial catch.

International cooperation has been effected by the action of Dr. R. von Ihering of the Instituto Biologico of Sao Paulo, Brazil. In this country the shrimp fishery is of considerable importance, and Dr. von Ihering has kindly furnished statistics of the catch and valuable specimens from various localities, thus extending the scope of the inquiry far to the south and covering practically the entire range of the species.

The combined staffs, in consultation with the bureau's officials, carefully considered the problems presented by the shrimp industry, with the objectives of (1) maintaining the optimum productivity of the fishery and (2) furnishing biological information useful to fishermen, packers, and legislators. The program so formulated comprises the following fields of investigation:

(*a*) Life histories of the principal commercial species, including problems concerning breeding, spawning, embryology and larval history, postlarval growth, and longevity.

(*b*) A statistical analysis of abundance which would require a compilation of the existing data and plans for the gathering of future statistics.

(*c*) Habits and reactions of the young and adult shrimp in relation to food and food getting, migrations, molting, spawning, temperature, and salinity.

(*d*) A systemic examination of all shrimp occurring in the commercial catch in the various fishing localities and biometrical studies of the principal species throughout their range for the determination of possible racial differences which would have a bearing on problems of migration or local depletion.

(*e*) The effects of fishing in relation to gear, localities, and time on the composition of the shrimp catch and on the other species of economic importance.

(*f*) The anatomy of the principal species of shrimp in relation to spawning and feeding.

(*g*) Diseases and parasites affecting the shrimp.

It was decided that the bureau's investigators should devote their efforts mainly to classes (*a*), (*b*), (*d*), and (*e*), and the scientists of the Louisiana Department of Conservation to direct their activities toward the solution of (*c*), (*f*), and (*g*), with general consultation and cooperation in all phases of the problem.

Of the species appearing in the commercial catch *Penæus setiferus* is by far the most important and deserves the most intensive study; only two others, *Penæus brasiliensis and Xiphopenæus kroyeri*, are abundant enough to require consideration.

Progress toward the various objectives outlined above is being made; but because of the complexity of the problem, it seems advisable to defer any formulation of results until more data are available. Because of their importance, however, the trend of work in two phases may be mentioned. A satisfactory analysis of the catch statistics, especially in regard to the intensity of fishing, a question of prime importance, is impossible because of the inadequacy of the data. It will be necessary to have recourse to figures supplied by certain packers who have records of catches of individual boats over a number of years. The inadequacy of the fisheries statistics in the States concerned is so serious a handicap to investigations of this character that it is hoped in the future some of the far-sighted legislators may be able to remedy this unfortunate lack.

With regard to the life history, the size-composition analysis of the catch, particularly in Georgia, is furnishing valuable information. Although it would be premature even to outline the life history, there can be little doubt that the life span is short and that most of the fishery rests upon dangerously young or spawning individuals. It can not be too strongly emphasized that under these circumstances depletion, when it appears, is sure to run a tragically rapid course and that every opportunity should be embraced to furnish reasonable protection to this valuable animal.

GREAT LAKES FISHERY INVESTIGATIONS

The major field investigations in the Great Lakes area during 1931 were conducted on Lakes Michigan and Huron, while minor field operations were carried on on Lake Erie and also on Lake Champlain. Only one new major project was started in 1931, viz, the investigation of deep trap nets on Lake Huron and upper Lake Michigan. The other field investigations were continuations from previous years, those on Lakes Erie and Champlain being completed in 1931. As in previous years, the bureau enjoyed the fullest confidence of the conservation departments of the various Great Lakes States and of the fishermen and worked in close harmony with them. In spite of the severe curtailment in their appropriations, the States of Michigan and Wisconsin again gave liberal financial support to the Lake Michigan program, while the State of Vermont gave generous financial assistance in the Lake Champlain work.

CHUB-NET STUDIES IN LAKE MICHIGAN

The Lake Michigan investigation on chub nets, started in 1930 (see report for 1930) and conducted jointly with the conservation departments of Michigan and Wisconsin and a group of four fish-net and twine companies located in the Great Lakes area, was resumed in 1931, since it was found that in spite of the large numbers of fish employed in our 1930 experiments they gave no conclusive results. The primary objective of the Lake Michigan work was a study of the catch of chub nets in order to determine the selectivity of these nets with regard to chubs and to determine their destructiveness to immature trout.

The bureau's vessel *Fulmar*, again employed for the work, left its winter quarters at Sturgeon Bay, Wis., on April 23 for the first cruise of the season after having been thoroughly overhauled and painted during the winter months. Field operations continued until November 19. During this period the *Fulmar* covered a total distance of some 8,280 miles. Regular fishing operations were carried on from 6 Wisconsin ports, 5 Michigan ports, and 1 Illinois port. The usual procedure was to fish nets simultaneously out of six ports and make occasional changes in the itinerary in order to cover new fishing grounds. Nets with stretched meshes of the following sizes were fished: 2⅜, 2½, 2⅝, 2¾, and 3 inches. Data were recorded on the total bulk weights and numbers of trout and chubs taken by the nets of each size mesh. Individual lengths, weights, sex, and sexual maturity were recorded for all trout, and stomachs were preserved from occasional samples for food studies. Chubs were sorted by species, and individual biological data obtained for each species to the extent that time permitted. A grand total of 1,654 chub nets, each 510 feet long, or, in terms of total length, 159.7 miles of nets, were lifted during the season. Of these nets 929 were fished and lifted in Wisconsin waters, 576 in Michigan waters, and 149 in Illinois waters.

During the 1931 season 87,018 chubs and 8,551 lake trout were taken, which weighed 28,517 and 6,633 pounds, respectively. The figures show that both trout and chubs are more abundant in the Michigan waters than in the waters of either Wisconsin or Illinois. It is possible that this difference in abundance may be attributed to the larger mesh employed for chubs in the State of Michigan. Throughout the season it was found necessary to fish more nets on the Wisconsin shore than on the Michigan shore in order to secure adequate catches for biological data.

In addition to the fishing of experimental chub nets, certain hydrographic data were collected whenever weather permitted. This work suffered greatly during 1931 because of an unusually windy season and, hence, more complete series of data could not be obtained. The following data were secured in different parts of the lake: Temperatures, plankton samples, bottom organisms, bottom soils for geological analysis, and occasional transparency readings. Sixty-four soil samples, 160 plankton samples, and 75 collections of bottom organisms were secured. Temperature series in the deeper portions of the lake showed many reading below 4° C., the temperature at which fresh water reaches its greatest density. Bottom temperatures in localities more than 150 meters deep usually showed a tendency to run slightly less than 4° C. The lowest temperature obtained during the season occurred in 220 meters, 32 miles W. ½ S. of Manistee, Mich., where a reading of 3.6° C. was obtained.

A study of the surface currents of Lake Michigan as determined by drift bottles was begun on June 17 and continued until August 17. Some 283 bottles were set adrift during these two months, usually in transverse series across the lake. The bottles of a series were released at intervals of approximately 2 miles. The southernmost series extended from Chicago to St. Joseph, Mich., and the northernmost from Frankfort, Mich., to Kewaunee, Wis. Of the 283 bottles set adrift, 180 have been recovered to date, or a percentage recovery of 63.6.

The majority of the drift bottles recovered showed a tendency to move northward, which was to be expected because of the prevalent southwesterly winds. It is planned to continue these studies during the summer of 1932.

DEEP TRAP NETS OF LAKES HURON AND MICHIGAN

A new cooperative investigation, separate from that on the chub net, was started with the States of Michigan and Wisconsin on the deep trap nets. In June, 1929, the deep trap net was introduced in Lake Huron at Port Hope, Mich., primarily for the purpose of taking whitefish. During the past two years this type of gear has spread very rapidly throughout Lake Huron and upper Lake Michigan, including Green Bay. A deep trap net is virtually a submerged pound net, since it has lead, a heart, a tunnel, and a pot or crib. The crib where the fish are finally captured is entirely inclosed so that the entire net can be completely submerged. The crib varies from 18 to 35 feet in depth, 30 to 40 feet in length, and in width usually tapers from 24 feet at the front to 20 feet at the back, and the lead varies in depth from 25 to 45 feet. This net is usually fished at depths varying from 60 to 125 feet, although it can be fished at greater depths.

The principal criticisms heard regarding deep trap nets are that they take too many adult whitefish, thereby depleting the stock in the lake and glutting the market, and that they destroy too many undersized fish. The States of Michigan and Wisconsin and the fishermen are deeply concerned about the rapid spread of these nets throughout the Great Lakes and have therefore urged the bureau to make a study of their action upon the fish stock. The patrol boats of the conservation departments of both States were placed at the bureau's disposal in the preliminary surveys.

The survey in Wisconsin waters was completed during the period July 6 to 16, 1931, and a report, including a set of recommendations, was submitted by the joint commission. The survey in Michigan waters was carried on from July 24 to October 21, 1931, out of the following ports: Bay Port, East Tawas, Oscoda, Ossineke, Alpena, Rogers City, Cheboygan, Epoufette, Naubinway, Manistique, and Fairport. The Conservation Department of Michigan furnished one assistant for this work and all transportation. In view of the great importance of the study and of the many complications involved, it has been deemed advisable to continue the investigation another year before drawing up final recommendations.

STUDIES IN LAKE ERIE

Fishery investigations.—The spring of 1931 saw the completion of our experimental fishing with trap nets on Lake Erie begun in the fall of 1927. The report for 1930 referred to the study of the fishing characteristics of one of our experimental trap nets. This particular study was carried on at Lorain, Ohio, in 1930 for various species of fish, excluding the sauger, a species relatively unimportant in the commercial catch at Lorain. Since the only remaining principal objection of the commercial fishermen to the introduction of our experimental trap net for commercial fishing on Lake Erie was that too many legal saugers would be released by it (it is asserted that the sauger is the most active of the Great Lakes commercial species of fish and would escape from a net which would retain other less active species), it was deemed desirable to resume the experiments of 1930 at Sandusky, Ohio, on sauger grounds and during the sauger run in the spring of 1931.

Accordingly two investigators were detailed at Sandusky and carried on these experiments during the period March 12 to May 20, 1931. Length and weight measurements were secured for some 33,500 fish, including perch, saugers, and yellow and blue pike. It was found that though the percentage of legal fish released by our experimental net was greater in the case of the sauger than in the case of any other species studied, yet the benefits secured by the release of illegal fish would vastly compensate the fishermen for the loss of any legal fish. On the basis of our experiments we expect to recommend to the State of Ohio that the lifting crib of all trap nets be provided with a large mesh (not less than 3 inches as used) in the back and in one-third (or for a distance of not less than 3 feet) of the sides, top, and bottom adjacent to the back, and with a small mesh (not more than 2 inches as used) in the remaining two-thirds of the crib, including the tunnel.

In addition to the field work, much has been accomplished in the laboratory in a study of the life history of the yellow and blue pike perch, the sauger, the yellow perch, the whitefish, and the cisco of Lake Erie. The data for these studies were collected during our investigations of experimental fishing gear.

Limnological studies.—No field work was done in 1931 on the limnology of Lake Erie, but the time of one investigator was devoted entirely to the compilation of data collected over a period of five years and to the preparation of the final report. As stated in previous reports, the limnological investigation of western Lake Erie was carried on by the Ohio Division of Fish and Game, in cooperation with the bureau, under the immediate supervision of Dr. Stillman Wright. The principal objective was to determine the degree and extent of pollution and the effect of pollution on conditions of existence in the lake. The problem was attacked by making nearly simultaneous studies of the chemistry, plankton, and bottom organisms in the open lake, far from sources of pollution, and at the mouths of important rivers.

Conditions in the open lake were found to be apparently normal. The only evidence of pollution was the occasional presence of *B. coli.* At the mouths of the Maumee and Raisin Rivers there was considerable chemical evidence of pollution. However, the zones of oxygen depletion and carbon dioxide increase were limited to a small area in each case. Large amounts of soluble nitrogen compounds were added to the lake by the Maumee River. There was no oxygen depletion at the mouth of the Detroit River and the nitrogen content was low because of the great volume of water in this river compared to the volume of sewage added to it.

Maumee Bay was found to be a center of production for both phyto- and zooplankton. The plankton crustacea were nearly twice as abundant here as in the open lake, and more than fifteen times as abundant as at the mouth of the Detroit River. The abundance of plankton in Maumee Bay is presumably the result of the large amount of nitrogen compounds available. The paucity of plankton at the mouth of the Detroit River is explained by the facts that Lake

St. Clair is plankton poor and that there is no opportunity for production in the river itself.

In the open lake the principal bottom organism was the mayfly, Hexagenia. Near the mouths of the rivers this form was replaced by tubificid worms, which are recognized as highly tolerant to pollution. Using the number of worms as a criterion, the polluted area was divided into zones of heavy, moderate, and light pollution. Heavy pollution was found only at the mouths of Maumee and Raisin Rivers, and the total area involved was roughly 10 square miles. Moderate pollution was found also at the mouth of Detroit River; the combined area for the three rivers was approximately 20 square miles. Because of the accumulations of decaying organic matter in these two areas of heavy and moderate pollution, they can not be considered highly suitable for spawning grounds of fish. The combined area of the zones of light pollution was roughly 75 square miles. It is believed that the major part of this zone includes a substratum suitable for spawning purposes.

The undesirable effects of pollution have been contamination of the water by sewage bacteria and the reduction of spawning areas, but the harm done to the commercial fisheries by reduction of spawning areas has no doubt been offset, at least in part if not entirely, by the increase in plankton, which serves as food for young fish and for the adults of plankton-feeding species.

LAKE CHAMPLAIN

The chief objective of the Lake Champlain investigation was to determine the effect of commercial seining in Missisquoi Bay by Canadian residents on the abundance of pike-perch in the United States waters of the lake. It was believed that the series of public hearings held by the International Fact-finding Commission at Plattsburg, N. Y., Swanton, Vt., and Phillipsburg, Quebec, on October 15, 16, and 17, respectively, would complete the field work; but after a conference at Phillipsburg, Quebec, of the State and Provincial officials involved, it was found necessary to collect additional data, with special reference to sexual maturity of yellow pike-perch and the abundance of whitefish in Vermont waters. In cooperation with the State of Vermont, Doctor Van Oosten carried on the necessary seining experiments at Larrabees Landing and its vicinity during the period October 26 to November 16, 1931. Most of the data collected previously during this investigation have been analyzed in the laboratory; and as soon as other duties permit, the final report with recommendations will be submitted by the commission.

WISCONSIN LAKE STUDIES

STUDIES OF FISH GROWTH

The investigations of the lakes of northeastern Wisconsin which the bureau conducted in cooperation with the Wisconsin Geological and Natural History Survey in 1927, 1928, and 1930 were continued through 1931. During the months of July, August, and early September Dr. Ralph Hile, of the bureau, and Edward Schneberger, of the Wisconsin survey, with the aid of two assistants, collected data for growth study from 7,764 fish. These collections were made from six "type" lakes in which the growth rates of the perch, rock bass, and cisco are being studied. The policy of distributing scale envelopes to sport fishermen for the purpose of obtaining data on the game fish of the region was continued.

Since preliminary study indicated the possible existence of distinct races of ciscoes in the different lakes, a total of 720 specimens from five lakes were preserved for purposes of morphometric study.

The question of the existence within a single lake of local races having different growth rates was attacked from two angles. In Muskellunge Lake, which has a rather complex basin, collections of scale material were made in two widely separated bays. In the same localities 1,400 rock bass, bluegills, and perch were tagged. Since the tagging operations were conducted late in the season, the recoveries were not numerous. It is hoped that later recoveries may lead to conclusive results on the question of the extent of the wanderings of these species within the lake.

COOPERATIVE LIMNOLOGICAL INVESTIGATIONS

Physical, chemical, and biological studies of several of the lakes of northeastern Wisconsin were continued in the summer of 1931. The Trout Lake Laboratory of the Wisconsin Geological and Natural History Survey was opened on June 28 and the investigations continued until September 10; the fish work extended to September 18. These studies are entirely supervised and largely financed by the survey; but, in recognition of the bureau's modest cooperation, the following report is submitted by Prof. Chancey Juday and, because of its interest in relation to hydrobiological and aquicultural research in which the bureau is engaged, is published here.

The field party consisted of E. A. Birge, C. Juday, Edward Schneberger, F. H. Couey, S. X. Cross, George E. Burdick, J. B. Goldsmith, H. C. Baum, and K. A. Siler, biologists; F. L. Taylor, chemist; and W. L. Hafner, part-time surveyor and cartographer. In addition, Leslie Titus was employed in making chemical analyses of the lake residues in the chemical laboratory of the University of Wisconsin during the summer. The staff of the Bureau of Fisheries that took part in these cooperative investigations consisted of R. O. Hile, H. M. Field, and William Duden.

With the exception of the work on the transmission of solar energy by these lake waters, the investigations were confined chiefly to the six lakes that were selected for an intensive study of their fish fauna. Observations on solar-energy transmission were made on a number of other lakes, representing various types, in addition to those that were made on the six lakes selected for the fish studies.

A more sensitive reading instrument was used during the summer of 1931 for the observations on solar-energy transmission through these lake waters, so that it was possible to obtain results at greater depths. With the present galvanometer readings can be taken where the amount of solar energy is only about 0.001 per cent of that delivered at the surface of the lake. The results obtained at these greater depths serve to give a much better picture of the light and turbidity conditions in the lower strata of some of these lakes, and their relations to the photosynthesis that takes place in the deeper water. By the use of color screens, also, it is now possible to determine the quality as well as the quantity of light at different depths.

Excess oxygen produced by chlorophyll-bearing organisms has been found in a few of these lakes down in the region of the thermocline and the upper part of the hypolimnion, and these solar-energy observations have a direct bearing upon the problem of photosynthesis in these strata as well as in the deeper water. In Crystal Lake, for example, abundant growths of the moss *Drepanocladus aduncus* var. *aquaticus* are found on the bottom at depths of 18 to 21 meters, and similar growths of this plant are found in Weber Lake at depths of 11 to 13.5 meters. Such growths of plant material at these depths raised the question of the amount of solar energy present there for the process of photosynthesis. A number of observations taken in different years and at different times during the summer show that from 1 to almost 4 per cent of the solar energy that is delivered to the surface of the lake penetrates to a depth of 20 meters in Crystal Lake, while nearly 2 per cent reaches a depth of 13 meters in Weber Lake. These amounts of energy seem to be sufficient to enable this moss to carry on photosynthesis and grow profusely at these depths in spite of the fact that the summer temperature of the water varies from 7° to 12° C. at 18 to 20 meters in Crystal Lake, and from a little less than 9° to 15° at 13 meters in Weber Lake in the different years.

A stratum of water possessing an excess of dissolved oxygen was found in Silver Lake on August 28, 1931, and this excess represented oxygen that had been liberated in this region through the photosynthetic activities of the phytoplankton. The quantity of dissolved oxygen at 9 meters on this date was 13.2 milligrams per liter, which was equivalent to 127 per cent of saturation, and there was also a slight excess at 10 meters. Solar-energy readings taken during the summer showed that about 1¼ per cent of the amount of energy delivered to the surface of the lake penetrated to a depth of 9 meters and somewhat less than 1 per cent reached 10 meters. These results seem to indicate that the phytoplankton as well as the moss Drepanocladus are able to carry on the process of photosynthesis in the lower strata of a lake when the solar energy is reduced to about 1 per cent of the amount delivered to the surface.

Regular observations were made on the temperature and dissolved gases of the six lakes selected for the fish studies. Dissolved oxygen determinations were made for the purpose of obtaining some idea of the most suitable strata for fishing operations in the various lakes; this was true especially in Muskellunge, Nebish, and Silver Lakes, where there is a paucity of oxygen in more or less of the hypolimnion during the summer period of stratification. The general results of such analyses have been incorporated in previous reports, so they may be omitted here.

Some chemical determinations were made on the waters from about a hundred wells and springs situated in the vicinity of the various lakes. These analyses were made for the purpose of obtaining a comparison between the quantity and quality of the substances held in solution by the ground waters and those found in the neighboring lake waters. The general results of these analyses show that the ground water is "softer" than that of the neighboring lake in some instances, in other cases the two are about the same, while in still others the ground water is "harder" than the lake water. Further work on this problem will be necessary before any definite conclusions regarding the relationship between ground and lake waters in this district can be reached. Residues from about a hundred wells and springs were secured during the summer, and further analyses of them will be made at the first opportunity for such work.

The biological work consisted of (*a*) a quantitative study of the plankton of the six selected lakes, (*b*) a quantitative study of the bottom fauna of these lakes, (*c*) a qualitative and quantitative study of the food eaten by the fish, and (*d*) a study of the internal parasites of the fish. Material was also collected for an investigation of the rate of growth of the different species of fish that are found in the various lakes.

Muskellunge Lake yielded the largest average standing crop of plankton organic matter and Clear Lake the smallest, 1.15 grams per cubic meter and 0.58 gram, respectively. The volume of Silver and Weber Lakes has been determined, so that the average standing crop of the entire lake may be computed for them. For Silver Lake the average amount of dry organic matter in the standing crop of plankton was a little over 10,000 kilograms, which was equivalent to somewhat more than 100,000 kilograms of living material; the dry weight represented 115 kilograms per hectare of surface, or 102 pounds per acre, while the living weight was approximately ten times as large.

In Weber Lake the average amount of dry organic matter in the standing crop of plankton was 930 kilograms, which was equivalent to about 9,300 kilograms of living material; these amounts represented 60 kilograms of dry organic matter per hectare, or about 600 kilograms of living material per hectare, which were equivalent to 54 and 540 pounds per acre, respectively. The average standing crop of plankton in Weber Lake was only a little more than 51 per cent as large as that of Silver Lake on the basis of unit area.

Quantitative and qualitative studies of 676 bottom samples were made during the summer. The general survey of the bottom population was completed for five of the lakes, namely Clear, Muskellunge, Nebish, Silver, and Weber; owing to the large size of Trout Lake, much more time will be required to make an adequate survey of its bottom-dwelling animals. One of the interesting facts brought out in the survey was the comparative abundance of the bottom population in the shallow water where the bottom consisted of well-compacted sand and gravel. Such a substratum is generally regarded as unfavorable for insect larvæ, oligochaets, and other macroscopic bottom forms, but on these sandy and gravelly areas the macroscopic population ranged from 100 to more than 4,000 individuals per square meter. In the deeper water where the bottom consisted of mud, or a mixture of mud and sand, the number of individuals varied from none up to a maximum of about 9,000 per square meter. A considerable number of samples from the deepest portions of these lakes did not contain any macroscopic organisms, but all of the shallow-water samples contained at least a few organisms. The chief constituent of the bottom population, both in the shallow water and in the deeper areas, consisted of chironomid larvæ. Snails were especially abundant in some of the shallow-water areas.

The stomachs of 3,000 fish were examined for their food content. Of this number approximately 1,000 were found to be empty, leaving 2,000 specimens for analysis. Among those containing food material, there were 725 perch, 470 rock bass, 233 bluegills, and 273 ciscoes; the others consisted of game fish, minnows, and suckers.

The following table gives the average percentage of the more important items found in the stomach contents of the 725 perch.

Item	Average percentage
Caddis-fly larvæ	22.0
Fish	12.3
Cladocera (chiefly Daphnia)	8.5
Hexagenia larvæ	7.5
Chironomus larvæ and pupæ	6.5
Crayfish	4.8
Amphipods	3.6
Plant material	3.4
Total in 8 items	68.6

The eight items included in the table constituted a little more than two-thirds of the total stomach contents, while a little more than one-third consisted of caddish-fly larvæ and fish. Cladocera ranked third in importance. In addition to the above figures, it may be noted that 7 small perch of the 1931 brood contained 56 per cent Cladocera and 41 per cent Copepoda.

The stomachs of the 470 rock bass contained the following percentages of material.

Item	Average percentage
Dragon-fly larvæ	11.0
Chironomus larvæ and pupæ	9.8
Fish	8.9
Hexagenia larvaæ	7.8
Crayfish	7.6
Caddis-fly larvæ	5.2
Plant material	5.0
Snails	2.5
Total in 8 items	57.8

The results for the 233 bluegill stomachs were as follows:

Item	Average percentage
Plant material	25.7
Chironomus larvæ	22.0
Ants	11.5
Snails	9.7
Hexagenia larvæ	5.1
Amphipods	2.8
Total in 6 items	76.8

These results indicate that the bluegills are much more restricted in their diet than either the rock bass or the perch. The 6 items listed in the table constituted 76.8 per cent of the food material found in the bluegills as compared with 57.8 per cent for 8 items in the rock bass and 67.6 per cent for the 8 items in the perch. The large percentage of plant material found in the stomachs of the bluegills is also an important difference; it amounted to 3.4 per cent in the perch, 5.0 per cent in the rock bass, and 25.7 per cent in the bluegills.

The menu of the 273 ciscoes was still more restricted, as indicated in the following table:

Item	Average percentage
Cladocera	45.6
Copepoda	32.8
Corethra larvæ	2.1
Chironomus larvæ	1.8
Total in 4 items	82.3

Two items, namely, Cladocera and Copepoda, make up more than 78 per cent of the food material of the ciscoes. In 67 ciscoes obtained from Clear Lake, 96.4 per cent of the food consisted of Daphnia. This table shows that there is very little competition for food material between the ciscoes and the other three species enumerated above.

During the summer 2,643 fish from the various lakes were examined for internal parasites. The perch were rather heavily infested in four of the five lakes from which specimens were examined in considerable numbers. The flesh and digestive organs of only 195 out of 652 perch were negative, and 164 of those that were negative came from Weber Lake. Excluding those from Weber Lake, only 6 per cent of the specimens from the other four lakes gave negative results. No explanation of the very small percentage of infestation in the Weber Lake perch has been found so far; only 11 specimens out of 175 harbored parasites. It may be mentioned in this connection that 7 specimens of smallmouth black bass from Weber Lake also gave negative results. A small trematode larva was found in the eyes of 96 per cent of the perch from Trout Lake, in 98 per cent of those from Muskellunge Lake, and in 100 per cent of those from Nebish and Silver Lakes.

The flesh and viscera of the rock bass yielded a high percentage of parasites; the infestation varied from 88 per cent in Trout Lake to 100 per cent in Nebish and Silver Lakes. The small trematode larva was found in the eyes of only 30 per cent of the rock bass from Silver Lake, but this infestation reached 90 per cent in Muskellunge Lake and 100 per cent in Nebish and Trout Lakes.

Trematode larvæ were found in the viscera of all of the bluegills (180 specimens) from Muskellunge Lake, and 20 per cent of them also had cestode cysts; 92 per cent of them had trematode larvæ in their flesh, and 60 per cent had trematode larvæ in their eyes.

Thirty ciscoes from Silver Lake were examined for parasites, and cestodes were found in the intestines of all of them; 80 per cent of them also had Acanthocephala. In Muskellunge Lake 80 per cent of the ciscoes contained cestodes and 20 per cent were free of visceral parasites. In Trout Lake 16 per cent were negative, 82 per cent had cestodes in their intestines, and 10 per cent also had Acanthocephala. The ciscoes from Clear Lake, on the other hand, were 96 per cent negative; only 2 specimens out of 60 examined yielded any parasites. These fish were found to be feeding almost exclusively on

Daphnia, and this may be partly responsible for the very small parasite infestation. Clear Lake also has very soft water, and the snail population, as a result, is relatively small, so that the danger of parasite infestation from this source is correspondingly small. Weber Lake also has soft water and a comparatively small snail population, and this may account, in part at least, for the small number of parasites found in the perch of that lake.

In the investigations relating to the growth of the perch in the northeastern lakes, Edwin Schneberger has read and measured the scales of about 3,000 specimens, from which rates of growth have been computed.

In June, 1931, the following papers relating to the investigations made on Wisconsin lakes appeared in Volume XXVI of the Transactions of the Wisconsin Academy of Sciences, Arts, and Letters.

1. A third report on solar radiation and inland lakes. E. A. Birge and C. Juday.
2. A second report on the phosphorus content of Wisconsin lake waters. C. Juday and E. A. Birge.
3. Copepods parasitic on fish of the Trout Lake region, with descriptions of two new species. Ruby Bere.
4. Leeches from the lakes of northeastern Wisconsin. Ruby Bere.
5. Note on the determination of total phosphorus in lake water residues. Leslie Titus and Villiers W. Meloche.

PACIFIC COAST AND ALASKA FISHERY INVESTIGATIONS

On May 22, 1931, the personnel and equipment of the Stanford University field station of the Bureau of Fisheries were transferred to the new Fisheries Biological Laboratory at Seattle, Wash. All of the bureau's biological investigations, dealing with Pacific coast fishery problems, except those relating to shellfish and the cooperative work on California trout, are now being carried on at this station.

The laboratory building of this new station is constructed of brick and is fireproof throughout. It has three full stories and contains 29 offices for individual workers. The lower floor is taken up with storerooms, photographic dark rooms, the heating plant, a room which can be kept at constant temperature for the storage and space for working on fresh or preserved specimens. The second floor consists entirely of offices. The third floor is composed of additional offices, two chemical laboratories, a fireproof room for the storage of valuable data and a large library. Connections for gas, hot and cold water, steam, compressed air, and vacuum are available in virtually all of the individual offices, so that they may be converted readily into experimental laboratories whenever the need occurs.

The staff of investigators of the International Fisheries Commission, United States and Canada, is occupying quarters in the building at present, and offices for a statistical agent and a technologist and one of the chemical laboratories has been fitted up for use of the division of fishery industries.

ALASKA RED SALMON

Karluk red salmon.—Marking experiments were continued at Karluk, Alaska, during 1931 for the purpose of determining if possible the mortality of the red salmon while the fish are in the salt water and also to provide a check on the readings of the salt-water growth taken from the scales. Fifty-five thousand red-salmon fingerlings were marked as they were migrating to the sea. The commercial catch was sampled for the return of fish marked in 1928, 1929, and 1930.

In 1930, 55,000 migrants were marked, 50,000 by the removal of one ventral fin and the adipose fin and 5,000 by the removal of the right pectoral fin and the adipose fin. This was the first time the pectoral mark had been used at Karluk. The first returns from this marking appeared this year, and it is of interest to note that the returns of fish marked by the removal of the right pectoral fin and the adipose fin were comparable to the returns of the fish marked by the removal of one ventral fin and the adipose fin; therefore, it appears that the use of this mark will prove to be satisfactory.

The study of the returns from known escapements of spawning salmon was continued. The run of 1931 was, for the main part, the return from the brood year of 1926. The escapement of 1926, 2,500,000 fish, was the greatest escapement of red salmon into Karluk River of which we have any record; and had conditions on the spawning grounds been favorable, a very large run in 1931 undoubtedly would have been produced. The run in 1931 was, however, only fair. That conditions on the spawning grounds were not favorable was noticed by observers in 1926, and their observations were included in the first Karluk report, " Investigations concerning the red salmon runs to the Karluk River, Alaska," by Charles H. Gilbert and Willis H. Rich, in which it was stated in regard to the low water in the Karluk River watershed, "* * * Just what effect this will have on the success of the spawning is problematical; it may be slight or it may be great enough to offset in considerable measure the effect of the fine spawning escapement * * *."

We have, then, two brood years which are somewhat comparable—1924 and 1926. In 1924 the red-salmon escapement was about 1,000,000 fish and the pink-salmon escapement was estimated at over 4,000,000 fish, the pink salmon occupying to a great extent the same spawning grounds as the red salmon. The spawning beds were so crowded, due to the very large escapement, that the result of the spawning was poor. Only a few thousand pink salmon returned to Karluk in 1926 from the spawning escapement of over 4,000,000 fish, and the return of red salmon from this brood year was less than 1 to 1. Overcrowding on the spawning grounds was undoubtedly the chief cause of the poor returns.

The summer of 1926 was unusually dry at Karluk, resulting in a lowering of the level of the spawning streams entering into Karluk Lake and also a lowering of the level of the lake itself. Thus the area of the spawning beds was reduced, and the good escapement of 2,500,000 red salmon caused overcrowding on the spawning grounds. Both in 1924 and 1926 there was noticeable overcrowding, and in both cases the return from the spawning escapement was less than 1 to 1. We are faced, then, with the evidence that too large an escapement is just as unfortunate as too small an escapement.

It must be pointed out here, however, that the evidence can not be interpreted to mean that every time there is an escapement of 2,500,000 red salmon into Karluk River that there will be a poor return, for if climatic conditions at Karluk Lake had been normal in 1926, the spawning grounds would not have been overcrowded.

Three trips were made to Karluk Lake to obtain limnological data and to observe conditions on the spawning grounds. This investigation has been conducted under the general direction of Dr. Willis H. Rich, of Stanford University.

Chignik red salmon.—The season of 1931 proved to be very favorable for the investigation of the red-salmon runs at Chignik, Alaska, which Harlan B. Holmes and assistants have been conducting for the past four years. The run of mature fish, amounting to approximately 1,500,000, was sufficient to permit fishing by the greater part of the traps throughout the season. As a result of this condition it was possible to collect numerous data for age analysis of the run and to study the adequacy of sampling. During the two preceding seasons studies of sampling were undertaken, but a poor run in 1930 and the dominance of a single-age class in 1929 made these attempts of little value. The run of 1931 was very favorable, not only as a result of continuous fishing but also as a result of a good representation of at least four age classes. A preliminary study of the data has shown an orderly progression of runs of the several age classes, the fish of a single class starting with few individuals, gradually increasing to a maximum of abundance, then gradually declining until it finally disappears. The overlapping of two or more such independent runs gives the general run a complex and constantly changing age composition. This complexity apparently is increased by the existence of two independent races of red salmon supported by the spawning grounds of the two lakes in the Chignik system. Each of these two races is represented by the four age classes, making a total of eight such classes to be considered in the analysis of the run.

Comparison of the catches of traps on the two sides of Chignik Bay, separated by a distance of approximately 6 miles, shows that traps on one side catch a significantly greater proportion of larger and older fish than those on the other. The reason for this difference is not apparent unless it be that the fish of different ages tend to follow opposite shores of the bay. This evidence of selective fishing further increases the needs for extensive sampling.

Observations of the young fish in fresh water were continued in 1931. Samples of migrants and lake residents were collected at frequent intervals. Approximately 70,000 of the seaward migrants were marked by the removal of fins.

The problem of independent races is proving to be very important at Chignik. It was at first supposed that the spawning fish scattered at random over the entire spawning area and that as a result the entire population represented a single race. More recent observations indicate that the two lakes support separate groups, or races, of fish. Those fish whose parents spawned in the tributaries of one of the lakes seem to return to that lake to spawn, thus perpetuating the independence of the two races. The two races seem to have different habits; for example: One starts its spawning migration earlier in the season. These racial differences probably are responsible for a great part of the complexity of the problems encountered at Chignik. Special attention is to be given to the races during the next field season.

Copper River red salmon.—An investigation of the red-salmon runs of Copper River, Alaska, has been continued by Seton H. Thompson, assisted by Morris Rafn. This work has been directed toward securing a knowledge of the age groups represented in the runs and their relative importance, the time at which fish bound for the various widely separated spawning grounds pass through the commercial fishery at the delta, and the present condition of the fishery.

A scale study has revealed that the red salmon of the Copper River mature at various ages ranging from 3 to 7 years and live for one to four winters in fresh water before the time of their seaward migration. Only 3 of the 11 age groups represented have been of significance in any of the recent runs. Of these, the fish maturing in five years, which have spent two winters in fresh water, have been the predominating age group. The relative importance of these age groups has changed with some degree of regularity during each season.

For the purpose of determining the time at which the salmon that spawn in the different tributaries pass through the gill-net fishery at the delta, records have been obtained of the daily catch by the commercial fishery at the river mouth, by the Indian fish wheels distributed along the entire length of the river, and by gill nets operated in some of the more important tributaries. The runs, so obvious at the mouth of the river, may be traced to their ultimate destination by this method, and regulations may be promulgated to provide adequate seeding of each spawning area. The collection of uniform statistics has been facilitated by the use of forms prepared for that purpose.

In connection with these observations data have been collected which are designed to show whether or not the salmon utilizing distinct spawning areas of the Copper River develop physical characteristics by which they may be distinguished. The analysis of these data is not yet complete.

An effort has been made to determine the extent of the spawning beds of the river and its tributaries. With this proposition in view, the seeding of the known spawning localities is observed annually. Much of the river system, because of the difficulty of access during the summer months, has not been explored and new spawning areas are being discovered each year.

Bristol Bay red salmon.—A. C. Taft, who was formerly in charge of the Bristol Bay red-salmon investigation, was transferred to other work during the latter part of 1930. T. L. Schulte carried on the necessary field work in this locality during the summer of 1931.

A very extensive collection of downstream red-salmon migrants was secured from Aleknagik Lake, its tributaries, and Wood River. Total length and body measurements have been made of these specimens and samples of the scales have been mounted. These data upon analysis should yield much information regarding the early life history of the red salmon of the Wood River and its tributary lakes and streams.

Scale samples were also collected from adult red salmon caught both in the Wood River system and in the commercial fishery in Bristol Bay itself. Trips of inspection were made to the other principal fishing areas in Bristol Bay.

ALASKA PINK-SALMON INVESTIGATIONS

This investigation is concerned with the study of the life history of the pink salmon (*Oncorhynchus gorbuscha*). During the past year the following experimental studies were pursued under the supervision of Dr. F. A. Davidson:

Application of "parent stream" theory to life history of pink salmon.—The experiments underlying this study consist of marking pink-salmon fry from a given stream as they leave the stream by means of clipping the dorsal and adipose fins from their backs. This is followed by a careful observation of the adult pink salmon, returning to the stream two years later to search for individuals bearing the marks. These experiments were started in the spring of 1930 at the Duckabush (Wash.) hatchery on Hood Canal, where 36,000 pink-salmon fry were marked. In the fall of 1931 the pink salmon that returned to other streams on the canal, as well as those returning to the Duckabush River, were observed for adults bearing the marks. Eight adult pink salmon, consisting of males and females, showing both dorsal and adipose marks were found in the Duckabush River. One adult female was found in the Hamma Hamma River, located just north of the Duckabush River, and one adult male was found in the Docewallips River, just south of the Duckabush River, both of which showed both dorsal and adipose marks. An examination of the scales of these marked salmon showed that the time of their return as adults coincided with their age indicated by the checks on their scales.

In the spring of 1931, in Snake Creek, at Olive Cove, Alaska, 50,000 pink-salmon fry were marked by means of clipping their dorsal and adipose fins. These fry are expected to return in the fall of 1932. The marking experiments in Alaska are being supplemented by racial analysis of the pink salmon in the streams in which fry are marked. During the summers of 1930 and 1931 the pink salmon in Snake Creek and the pink salmon in Anan Creek, a neighboring stream, were studied from the racial standpoint.

Variation in time of appearance of pink-salmon runs in southeastern Alaska.—Through the courtesy of the salmon packers operating in southeastern Alaska, the bureau secured the records of the daily pink-salmon catches of a large number of salmon traps located in the various fishing districts throughout the territory. These records in general cover a period of time from 1908 to 1930, inclusive, and are believed to be representative of the changes that have been taking place in the status of the fishery.

Since the salmon traps are stationary units of gear and more or less permanently located, it was assumed that the time of appearance of the pink-salmon runs in any district would be indicated by the time in the fishing season the pink-salmon catches were made by the salmon traps located in the district. With this assumption in mind, a statistical analysis was made of the daily pink-salmon trap-catch records of the salmon traps located in each fishing district in the territory for the purpose of ascertaining variations in the time of run.

A similar analysis of the daily pink-salmon packs of a southeastern Alaska cannery showed that from 1895 to 1909 the pink-salmon runs were much later than they are at the present time. In looking over Reports of the Commissioner of Fisheries for these years, numerous references were found concerning the enormous quantity of pink salmon in the territory. Following this period the total yearly packs of pink salmon increased rapidly in the Territory, and it was then that the runs began to come in early. They reached their earliest stage between the years 1914 and 1918, after which their appearance has been increasingly retarded. According to the Reports of the Commissioner of Fisheries, the fishing regulations were enforced more and more effectively after 1918 and, with this increased protection, the pink-salmon runs began to build up. This recuperation of the pink-salmon runs is evidenced by the increase in the average total catches of the traps in a number of fishing districts during this period.

It appears that from 1895 to 1909, when the pink-salmon population in the Territory was at its maximum, in so far as there is a record, the pink-salmon runs were much later than they are at the present time. Then, from 1909 to 1918, when exploitation of the runs was very intensive and the salmon population was greatly reduced, the runs became early. Finally, when the Bureau of Fisheries began to enforce the fishing regulations more effectively and impose more adequate regulations in 1924, the pink-salmon population began to build up and at the same time the runs started to come in later in the fishing seasons. In other words, there seems to be a significant relationship between the size of the pink-salmon runs and the time of their appearance in the fishing seasons.

STATISTICS OF THE ALASKA SALMON FISHERIES

Compilation and analysis of the statistics of the Alaska salmon fisheries has been continued by Dr. W. H. Rich and E. M. Ball, of the Alaska division. A second part of this series was published during the past year and covered the district from Chignik to Resurrection Bay. Part 3, which covers the Prince William Sound area and the Copper and Bering Rivers, has been completed and will be published in the near future. Much of the preliminary work has been done on part 4, which will cover southeastern Alaska and will complete the study of the statistics from the inception of the industry up to and including the season of 1927, from a standpoint of total-catch records.

ALASKA HERRING

In September, 1931, a scientific report was submitted to the bureau for publication by Dr. George A. Rounsefell, in charge of the herring investigation, and Edwin H. Dahlgren, showing the fluctuation in the abundance of herring in the Prince William Sound region of Alaska. The herring fishery of this region has been marked by fluctuations in the abundance, size, and quality of the fish, which have caused heavy losses to the operators. The stabilization of the yield of this fishery is an important economic problem. This report shows clearly that these changes in abundance are caused by inequality in the numerical strength of the annual increments to the population proceeding from each year class and by insufficient numbers of older fish, owing to a too intensive fishery.

The availability of the herring in different portions of the season was carefully analyzed and tables computed showing what percentages of the total catch is taken in each 10-day period. This knowledge is essential, since the amount taken during such a period varies materially through the season. Knowing these figures, it is possible to reduce the total catch any desired percentage by means of closed seasons. The extreme localization of the fishing grounds is shown by an analysis of the catches for eight years (1923 to 1930, inclusive). During this time 50.7 per cent of the total catch was taken in the waters contiguous to the southern end of Evans Island, 46.6 per cent from other restricted localities, and 2.7 per cent from all of the remainder of the immense area of Prince William Sound.

In attempting to discover if these various areas supported independent populations, it was found that the means of the number of vertebræ for various year classes of herring differed significantly. Comparing vertebral-count samples of the same year class only (to allow for annual variations in temperature), it was found that the herring populations of McClure Bay and MacLeod Harbor each seem to differ from the remainder of the herring of Prince William Sound.

Body-length frequencies of the herring from Prince William Sound were available for seven years (1924 to 1930) and age frequencies for six years (1925 to 1930). These length frequencies show clearly the progression, year by year, of size modes, due to the growth of fish of dominant year classes. The year classes are so unequal in abundance that one or two year classes usually constitute the bulk of the catch even though several are represented. Thus the 1926 year class, which was unusually abundant, constituted 78.2 per cent of the catch in 1928, 93.3 per cent in 1929, and 87.5 per cent in 1930.

The fluctuations in the catch caused by these dominant year classes are of great importance to the fishery. During the intervals when no abundant year classes of young fish are present the fishery must be supported by a reserve of the older age groups. Depletion of these older age groups by a too intensive fishery seems to have caused the variations in yield which characterize the fishery during the past few years. Unless protection is adequate to insure a sufficient quantity of older age groups at all times, the fishery can not be maintained without such undesirable fluctuations. In order to insure such a supply of older fish it was recommended that a 48-hour weekly closed season be put into effect, and that the purse seines be reduced from 180 to 150 fathoms in length.

The field work of the herring investigation has been aided very materially by the purchase of a motor vessel in July, 1931, which provides comfortable living quarters and laboratory space. Using this vessel, racial samples were obtained for the first time from Saginaw Bay in Frederick Sound, Gut Bay in Chatham Strait, Point Lull at the eastern entrance to Peril Strait, Point Augusta in Icy Strait, and Anita Bay in Zimovia Strait. Samples of fish for vertebral counts totaling 13,900 are now available from over 40 localities in southeastern Alaska. All of the ages of these herring have been read, and an analysis is now being made of the numbers of vertebræ to determine their racial significance.

The usual annual samples were collected from Prince William Sound. In the Aleutian Islands district Marcus W. Meyers preserved gill-netted samples from Dutch Harbor, and additional frozen samples of purse-seined herring were obtained from Lost Harbor on Akun Island.

PUGET SOUND SOCKEYE SALMON

During 1931 an investigation of the sockeye-salmon fishery of Puget Sound was started under the direction of J. A. Craig, with the intention of solving the following problems: (1) Devising a reliable index to the relative annual abundance of the sockeye salmon in Puget Sound during the past 20 years; (2) the discovery of whether or not regular fluctuations exist in each fishing season from year to year in abundance of the sockeye salmon, and if such fluctuations do occur at what dates they take place; (3) ascertaining whether or not distinguishable races of sockeye salmon pass through the Puget Sound fishery, and if so, at what regular dates during the fishing seasons these racial migrations take place. Since the great majority of the sockeye salmon taken in Puget Sound are fish migrating into the Fraser River to spawn, these races, if their existence can be demonstrated, will be mainly races of sockeye salmon spawned in various parts of the Fraser River system.

Records of daily catches of individual traps in Puget Sound have been collected, and these data are being used to determine indices of annual and seasonal abundance. Since these traps are fixed pieces of fishing gear and have been fished under the same conditions through the period of time covered by the data collected, the average catch per trap per fishing day will be used as the unit of fishing effort in making the annual and seasonal indices of abundance. A great part of the preliminary statistical work has been done, and a publication dealing with this phase of the problem will soon be completed.

ROGUE RIVER STEELHEAD TAGGING

The tagging of steelhead trout in the Rogue River, under the direction of J. A. Craig, was continued through the summer of 1930 and the winter of 1930–31. These tagging experiments were undertaken for the purpose of determining whether or not two separate populations of steelheads inhabit the Rogue River, one of which makes its spawning migration during the summer and early fall months and the other during the late fall and winter. If two races of steelheads spawn in this stream, it appears that they must spawn either in different localities or at different times. Therefore it is hoped that the tagging experiments, which will give definite information relating to the time and extent of the spawning migrations of the fish entering the river at different seasons, will provide material for answering this question.

The returns from the fish tagged during the summer of 1930 confirm those obtained from the 1929 tagging activities, namely, that the fish entering the river during the summer and early fall migrate to the higher reaches of the river and spawn in the upper part of the Rogue River itself, or in some of the higher tributaries.

Because of high water and bad weather conditions, which made it almost impossible to catch the migrating fish, it was possible to tag only 50 steelheads during the winter of 1930–31. One of those tagged fish was recovered in July, 1931, in the upper portion of the Rogue River.

Another attempt is being made to tag these fish during the winter of 1931–32; and until some recoveries are made from that tagging the question of whether or not two separate populations of steelheads inhabit the Rogue River can not be definitely answered.

CONSERVATION OF FISH BY MEANS OF SCREENS AND LADDERS

The activities of the bureau's engineers, Shirley Baker and U. B. Gilroy, in perfecting fish screens and ladders for the conservation of the runs of anadromous and migratory fishes in the rivers of the Pacific Northwest during 1931 included (1) the construction of a revolving mechanical fish screen on the Jocko Canal, Mont.; (2) the preparation of, design, and specifications of a revolving mechanical fish screen for the Sun River Slope Canal in Montana; (3) continued operation of mechanical and electric screens on Government diversions in the State of Washington; (4) assistance rendered the State Commissions of Maine, Oregon, Nevada, and Utah regarding fish screen and ladder problems; and (5) the designing of fishways for Sunbeam Dam, Idaho, and Anan Creek, Alaska, and various other inspections and engineering services on major hydroelectric projects in the Pacific Northwest.

MECHANICAL FISH SCREENS

The revolving mechanical screen recommended and used by the bureau follows the design developed by the Oregon State Commission in 1921, and since that time adopted by the State of Washington. This type was first installed in Ahtanum Canal by the bureau in 1929 and described in previous reports. It continues to be the most satisfactory and reliable type of which we have knowledge, and properly installed is positive in its action. The device is not patented.

Jocko Canal screen.—This year to prevent the serious loss of fish on the Flathead project of the United States Indian Irrigation Service in Montana and to encourage the adoption of this type of mechanical screen in that State the bureau installed such a screen on the Jocko Canal. This canal has a capacity of 300 second-feet. The installation consists of three sections of revolving screen cylinders, each being 4½ feet in diameter and having a width of 10 feet.

The point of installation is 6 miles downstream at the outlet of the lower of two small lakes through which water, diverted into the canal from Jocko River, is passed. The purpose of the installation is to prevent rainbow trout from leaving the lakes, and thus it is hoped to accumulate an attractive supply of fish in those waters.

Sun River slope screen.—In the proposed Sun River slope screen we have the most ambitious attempt yet made in the application of the revolving mechanical screen. The capacity of this canal is 1,435 second-feet. On this project water is taken from Sun River at a diversion dam in a narrow canyon and transported by canal to Pishkun Reservoir. From the reservoir the water is conveyed to the system through the Sun River Slope Canal. The site selected for the installation of the screen is at a point approximately ½ mile below the outlet of Pishkun Reservoir. At this point the canal widens out into a natural pond, affording favorably reduced velocities just upstream of where it is proposed to stop the fish by means of the screen.

The typical section of the Sun River Slope Canal has a bottom width of 30 feet, and for the capacity flow of 1,435 second-feet the depth of water is 11.5 feet. In order to maintain satisfactorily low velocities through the screen box the design calls for installation of the screen in five sections, each having a width of 14 feet and a diameter of 13 feet. The supporting box of reinforced concrete contains approximately 370 cubic yards of 1:2:4 concrete and approximately 50,000 pounds of reinforced steel. The five sections of screen are driven by three paddle wheels located just downstream from the screen cylinders and connected to the latter by means of chain and sprocket gearing. In the fabrication of the screens and paddle wheels approximately 20 tons of steel are required. The covering of the screen cylinder is to be No. 10 gage galvanized steel or copper wire screening having a ⅝-inch clear opening mesh.

Final working drawings of this screen will be filed with the Reclamation Service so that reference to them may be had by the Reclamation Service on all new projects wherein a fish-conservation problem is involved. This in itself is held to be justification for the time and expense contributed by the Bureau of Fisheries in preparing these plans. It will make possible, at the time that new projects are first planned, for proper fish screens to be provided in the original designs of the diversion structure, which will work both for the conservation of fish and economy in construction.

Cooperating with the Oregon Game Commission, field examinations were made and designs and cost estimates prepared covering mechanical-screen installations for Farmers Irrigation Ditch (capacity 100 second-feet), on Hood River, and C. O. I. Canal (capacity 650 second-feet), Pilot Butte Canal (capacity 450 second-feet), Tumalo Canal (capacity 150 second-feet), Swalley Canal (capacity 125 second-feet), and Arnold Canal (capacity 100 second-feet), the last five named being on the Deschutes River.

In the spring of 1931 the Utah Power & Light Co. applied to the Bureau of Fisheries for aid in solving the fish-screening problem at their Lift Plant, situated on Bear Lake. This lake constitutes one of the largest water-storage projects in the country. The problem involves trout of various kinds which frequent the waters of Bear River and Bear Lake. The situation is a peculiar one. Under the scheme of operation water is lifted from the lake by means of large-capacity, low-lift pumps and discharged through a canal into Bear River, where it flows through a series of power plants. During high stages of the river the flow is reversed, and the canal conveys water from the river through the pumping plant for storage in the lake.

The situation was studied very carefully in the field in company with the district supervisor of the Bureau of Fisheries, the State Game Commissioner of Utah, and the engineers of the Utah Power & Light Co. It was decided that instead of using either electric or mechanical screens, which for an installation of this magnitude would be prohibitive in cost, the best solution of the problem would be to gradually stock the lake with fall-spawning fish and protect the pumping plant by means of removable steel racks which would have to be held in place for only a short time each year. The company is being asked to provide these racks and to cooperate in bearing the cost of a new hatchery which is to be built on Bear Lake by the Bureau of Fisheries and the State of Utah.

ELECTRIC FISH SCREENS

In three previous reports of this division there is presented the history and development of the electric fish screen and its use by the Bureau of Fisheries up to the start of the irrigation season of 1931.

The experimental work conducted in the sluiceway at Gold Ray power house and at the Fort Klamath hatchery in the fall of 1930 demonstrated the superiority of the insulated type of screen over the old-style grounded installation, and led to the adoption of this improved type on all installations maintained by the Bureau of Fisheries. The improved type of screen consists of a double row of 6-inch diameter pipe electrodes fabricated from No. 20 gage galvanized iron. These electrodes, properly weighted at the lower end, are suspended in the water from supporting cables. The most effective spacing has been found to be 4 feet center to center of pipes in rows with 6-foot spacing between rows. Electrification is accomplished with 60-cycle alternating current at a potential ranging from 55 to 65 volts. Convenient voltage regulation is provided by means of a transformer specially tapped on the secondary side and designed to carry a sustained short circuit.

Three years of operation with the electric screen has disclosed the weaknesses of this type of fish-protective device. The chief difficulty is in the antagonism which is likely to develop in the public mind when some fish are killed or stunned by contact with the electrified water. Such attitude entirely disregards the fact that the electric screen may be operating to save the majority of fish, but it creates a problem in public relations which can not be overlooked. Furthermore, the action of the electric screen can never be expected to be 100 per cent effective as is the mechanical screen. Another difficulty is the patent situation, which raises a restriction which can be avoided by use of the mechanical screen. For these reasons the investigators do not recommend the electric fish screen for general use. In the case of the electric screens operated on United States Government projects in the Yakima country the situation is somewhat different. There the bureau itself operates the screens, giving them very careful attention and supervision, and in Yakima County, Wash., alone the use of the electric screen is free from patent royalties. These Yakima screens undoubtedly save a large proportion of the fish, and it is felt that the continued use of these particular electric screens is justified.

Sunnyside electric screen.—The Sunnyside Canal, main diversion of the Yakima project of the United States Reclamation Service, diverts water from the Yakima River near Yakima, Wash. The capacity of the canal is 1,500 second-feet. The diversion period of 1931 extended from February 20 to October 20. During the period of maximum irrigation demand, which is also the period of chief migration of fish, this canal carried in excess of 1,000 second-feet.

This screen is of the new, improved insulated type, consisting of a double row of pipe electrodes located in the forebay in front of the headgates. This year the location of the screen was moved upstream and out of the river as far as practicable in order to escape the higher water velocities which existed at the old site.

In addition to this main electric screen there was installed an auxiliary screen of similar type extending out from the upstream end of the main installation at right angles to the shore line for a distance of 24 feet. The purpose of this auxiliary screen is to give a preliminary warning to downstream-migrating fish as they approach the diversion point, and thus it is hoped to divert these fish before they enter the higher water velocities which exist at the main screen.

As previously commented upon, water conditions at Sunnyside Dam at certain times produce very severe operating conditions affecting the electric screen. The crest length of Sunnyside Dam is 500 feet. During practically the entire irrigation season flashboards are maintained along the crest raising the water surface approximately 2.5 feet. At the center of the dam is located a large concrete fishway built by the Bureau of Fisheries in 1929. This ladder constitutes the chief by-pass channel at the Sunnyside installation. It undoubtedly serves many downstream migrating fish, especially those that travel down river along the west shore. However, it has long been recognized as desirable to have a by-pass channel located close to the electric screen which is situated at the east abutment of the dam. To this end, early in July a stem gate was installed in the logway which extends through the dam close to the downstream end of the electric screen.

In the operation of any by-pass at the Sunnyside diversion the main difficulty is lack of water. The irrigation season of 1931 was the most critical short-water year in the history of the Yakima project. The Sunnyside diversion is the lowest Government diversion on the Yakima River, and at times the entire flow of the stream is diverted directly into Sunnyside Canal. At such times practically all the flow comes from storage reservoirs maintained by the Government, and all of this storage water is contracted for and sold to the irrigation interests. When these irrigation requirements exceed the available flow, there is no adequate by-pass flow available for the conservation of fish life.

There were times in the summer when there was practically no overflow, but whenever even a small amount of water was available for this purpose, the ready cooperation of the Reclamation Service insured that it was put through the by-pass channels.

Gold Ray intake screen.—Early in April the intake screen at Gold Ray power house of the California-Oregon Power Co. was put into operation at a point upstream of the trash rack at the intake. This screen, also, was of the improved insulated type, consisting of a double row of pipe electrodes. This year the screen was installed at an angle with the intake in the hope that such location would encourage use of the newly improved north bank fishladder as a by-pass for downstream-migrating fish. It proved, however, that close proximity to the steel trash rack was an unfavorable factor, it being found that a good many fish were passing through the electric screen and being trapped between it and the trash rack. Accordingly, use of this electric screen was discontinued late in May. It was found that the newly improved fish ladder with its illuminated entrance proved a very attractive by-pass for fish, even without the aid of a screen in the intake.

Gold Ray tailrace screen.—The first electric screen installed by the Bureau of Fisheries in the tailrace of the Gold Ray power plant of the California-Oregon Power Co., was put into operation in the spring of 1929. Its purpose was to keep the mature upstream-migrating salmon and steelhead out of the tailrace waters and headed up the main channel of the river to the fish ladders at the dam. For more than two years this screen operated, keeping the tailrace waters entirely free of upstream migrants and accomplishing its mission substantially without injury to the fish. Upon July 17, 1930, the old grounded type of screen was replaced by the new, improved type, consisting of a double row of 6-inch diameter pipe electrodes. The effectiveness of the new screen was early proved by its successful operation against the fall run of silver salmon and the run of steelhead which continued throughout the winter and spring of 1931.

On May 25 the Bureau of Fisheries was notified by an official of the Jackson County Game Protective Association, a local sportsmens' organization of Medford, Oreg., that hundreds of salmon were being electrocuted at the Gold Ray installation. Investigation was made May 27 and a large number of electrocuted salmon were found in the main channel of the Rogue River below the Gold Ray power plant. At this time, also, some salmon were found ahead of the electric screen in the tailrace. It is evident that these salmon had penetrated the screen very recently, for on April 25, when the site was inspected, a good run of Chinook was in progress, with schools of these salmon leaping in the tailrace just below the electric screen and the tailrace above the screen was entirely free of salmon.

A great deal of publicity had been given to the electrocution of salmon in the Rogue River, and the electric-screen installation was blamed for the condition. After field investigation on May 27 the voltage of the tailrace screen was reduced from 65 to 50 volts, and this potential was maintained for a short period of time, during which observations could be made. On May 30 the officials of this sportsmen's organization, acting without authority from the State Commission of Oregon or the Bureau of Fisheries, prevailed upon the vice president and general manager of the California-Oregon Power Co. to order the screen disconnected. Upon June 1 the electrodes were removed from the water. Upon June 2 and 3 the investigators, in company with representatives of the power company and the sportsmen's organization, inspected conditions in the field. At that time there were at least from 1,200 to 1,500 mature Chinook salmon in the tailrace, these having come in within a few hours after the electric screen had been deenergized. This was striking evidence of the effectiveness of the electric screen in having prevented the entrance of these salmon over a long period of time. At the end of this conference the bureau was advised by the officials of the Jackson County Game Protective Association that reinstallation of the tailrace screen was not desired. The bureau representatives held that the operation of the electric screen was in no way responsible for the electrocution of the salmon, and pointed to the record of success which this screen had enjoyed for a period of more than two years.

During the conference with this committee and the power company it developed that upon April 16 and May 29 there had been short circuits on a 66,000-volt line at Gold Ray. The Gold Ray plant is grounded into the river and the path of the current for these short circuits was through the river to Grants Pass substation No. 2. This explained the electrocution of the salmon in the vicinity of Gold Ray plant and for a considerable distance down river, for at this time this stretch of the channel was alive with a large run of Chinook Salmon.

A short time later the Oregon Fish Commission, feeling confident that the electric screen was not responsible for the trouble at Gold Ray and having information of similar conditions which had existed upon several occasions in previous years, long before the installation on any electric screen, sought information from the power company as to the occurrence of short circuits in this system. These data, covering a 5-year period, were made available to the Oregon Fish Commission, which in turn presented them to the Bureau of Fisheries for their study. Seeking the best possible advice in this matter, the Bureau of Fisheries retained Prof. F. O. McMillan, research professor of electrical engineering, Oregon State College, to make a thorough investigation of the situation, with special reference to any possible effect which might have been produced by the presence of the electric screen in the tailrace. After thorough study in the field and conference with officials of the power company, Professor McMillan reported under date of August 22, 1931:

> I can assure you at this time that the findings are such that there is absolutely no question in my mind but that the electric fish screen had nothing whatever to do with the destruction of the fish that were killed. You will probably recall that I have frequently called attention to the desirability of having the electric screen entirely insulated, from the electrical system supplying the power, by means of an insulating transformer, and that was the condition of operation of the electric screen at the Gold Ray power plant at the time of the electrical disturbances in question. During my investigation in Medford I personally measured the insulation resistance of the fish-screen transformer and of the conductors and cable supports for the electric screens and found the insulation to be absolutely intact. This means that it would be impossible for any of the ground current of the electrical system during an abnormal electrical disturbance to flow back through the electric screen.

In his comprehensive technical report, under date of October 4, are set forth the indisputable findings, which show:

> (1) That the electrocutions of fish which occurred on April 16 and May 29 were due to ground currents existing through accidental single-phase operation of the 66,000-volt line No. 7 between Gold Ray power plant and Grants Pass substation No. 2, these accidental single-phase operations occurring when attempts were made to reestablish service on line No. 7 following line breaks.
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> (2) That it was impossible for the electric screen to have conducted any part of the ground currents, because it was insulated from the electrical system by means of an insulating transformer designed for the express purpose of preventing any direct electrical connection with the supply system.
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> (3) That the operation of the electric screen at the time of the accidental grounds was probably responsible for preventing the destruction of a much larger number of salmon than did occur.

Thus we have absolute scientific proof that the operation of the electric screen was in no way responsible for the electrocution of salmon in the Rogue River and the unwarranted removal of this screen from the tailrace of the Gold Ray plant has deprived the river of an effective means of fish conservation.

Check of fish in Yakima ditches.—Check on the efficiency of the electric screens in the Yakima country is obtained by observation of fish found in the systems. As in the seasons of 1929 and 1930, comprehensive check of fish left stranded in the system at the end of the irrigation season was made and, in addition, during the past summer special checking operations were conducted at strategic points in the Sunnyside and Wapato systems. Likewise, W. N. Wagner, the bureau's inspector, paid close attention to the fishing conditions reported to exist in the canal systems and the rivers and himself fished these waters on numerous occasions for the purpose of obtaining data at first hand.

In the Sunnyside Canal (ditch capacity, 1,500 second-feet); irrigation season February 20 to October 20; main canal, 60 miles long; electric fish screen installed) check of the fish left stranded at the end of the season showed the following: 75 salmon, 807 trout,[3] and 36,300 whitefish.

As in the past, cull fish (suckers, squawfish, chisel mouth, etc.) predominate all other types. The great amount of whitefish found this year as well as last indicates that the electric screen is not efficient against this species. It is the opinion of competent observers that the bulk of the whitefish enter the system when they are very small (perhaps about 1½ inches long), which is the time when the electric screen would be least effective against them.

In addition to this comprehensive check made at the end of the season, a special check was conducted early in the summer in lateral 71.66 (Benton extension) at the lower end of the Sunnyside system. This location was the point at which some 10,000 young salmon were reported last year. The check was made by placing a stationary screen at an irrigation drop. The check was continued over the 71-hour period from noon June 18 to 11 a. m. June 21, during which period observers were in constant attendance. The flow of the lateral at the checking point was 35 second-feet. Results showed but 36 young salmon, no trout, 3 whitefish, and 517 cull fish. This check was made at a time when large schools of young salmon and trout were observed near the intake at Sunnyside Dam.

Salmon and trout were especially numerous in the Yakima River this year, and the small number of anadromous fish found in the system indicates that the electric screen functioned to prevent the loss of a large percentage of these fish.

The best possible comparison between fish conditions as existing on a screened and unscreened diversion in the Yakima country is furnished by the check upon the Tieton and Selah-Naches systems. On the Selah-Naches Canal, diverting about 300 second-feet and operated by a private irrigation company, there is no screening device of any kind installed. Two checks of fish left stranded in the Selah-

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[3] Total of 807 trout includes 400 reported by a local fisherman who, with rod and line, fished along 12 miles of canal and reported his own catch and those of several other fishermen as well.

Naches Canal were made this fall. The first count was made during the first shutdown of the season, which extended over the period September 16 to 20. The actual count of fish recovered was: 3,748 salmon, 543 trout, 1,142 whitefish, and 877 cull fish.

Upon September 21 the Selah-Natches again began to divert water. Approximately one month later the canal was shut down for the season. Check of fish actually recovered from the system at this time showed 825 salmon, 122 trout, 348 whitefish, and 139 cull fish.

Thus it is seen that this unscreened diversion taking water from the Naches River under conditions similar to those existing at the Tieton diversion disclosed a total of 5,238 salmon and trout, as against a total of 514 salmon and trout left in the Tieton system in which the electric screen had been in operation for only 141 days out of a total of 251 days.

FISH LADDERS

The activities conducted by this investigation in connection with fishways during 1931 include:

(1) Operation of fish ladders on Sunnyside and Wapato Dams on Yakima River.

(2) Design of fishways for North River project, Washington.

(3) Inspections and supervision of fishway construction at Rock Island project on Columbia River.

(4) Survey of fishway requirements for the State of Maine.

(5) Investigations and design of fishway for Sunbeam Dam, Idaho.

(6) Investigation and designs for improvement of channel at Anan Creek, Alaska.

In 1929 the bureau installed a reinforced-concrete fish ladder of large-pool design at the Sunnyside Dam of the United States Reclamation Service. In 1930 a similar structure was built to our design at the Wapato Dam of the United States Indian Service. Both these ladders on the Yakima River have been under the close supervision of the bureau. They have continued to function perfectly in passing the several large runs of salmon up the river without delay.

Proposed fishway for Sunbeam Dam.—Last spring the aid of the Bureau of Fisheries was asked by the Fish and Game Commission of the State of Idaho in the matter of the fishway problem existing at Sunbeam Dam on the upper Salmon River near Yankee Fork. The dam is of the concrete-arch type, approximately 30 feet high.

The scheme proposed by the bureau utilizes the present diversion tunnel as part of the fishway structure and will not in any way injure or impair the value of the property of the Sunbeam Mining Co.

Fishway problem at Anan Creek.—During the season of 1930 it was found that at certain water stages on Anan Creek, Alaska, the upstream-migrating salmon had considerable difficulty in ascending the channel, due to the presence of natural obstructions consisting of rapids and falls. Accordingly, in July, 1931, field examinations and surveys were made and a design worked out for the improvement of this condition. It was found that the principal obstruction occurred along the stretch of channel extending from the present log dam (situated 500 feet downstream from the counting weir) a distance of approximately 200 feet upstream to the head of the Upper Falls. The rise in water surface along this 200 feet of channel is normally about 12.8 feet.

The most practical solution of the difficulty is held to be by use of timber dams constructed of heavy logs faced with planking. The installation of three such new log dams along the critical stretch of channel was recommended.

NEW AND PROPOSED POWER PROJECTS

A matter of fundamental importance to fish conservation is the provision of proper equipment for the safe handling of fish at hydroelectric power developments. A good share of the activities of this investigation has been devoted to this work at new and proposed projects in the Northwest. During 1931 the following major developments claimed attention:

(1) Rock Island development of Puget Sound Power & Light Co. on the Columbia River, Wash.

(2) North River project of Western Washington Electric Light & Power Co. on North River, Wash.

(3) Ariel development of Inland Power & Light Co. on Lewis River, Wash.

(4) Cascade Rapids projects (application of Columbia River Power Co. and application of Charles O. Lentz et al.) at Cascade Rapids on Columbia River.

The Rock Island project.—The original requirements for fish protection as written into the project license of this major power development of the Puget Sound Power & Light Co. on the Columbia River near Wenatchee, Wash., called for the protection of both the intake and tailrace waters by means of electric fish screens. However, with the completion of the power house and east-channel spillway dam, in the winter of 1930, opportunity was afforded for the study of physical conditions at the site, and it became evident that there was good possibility that migrating fish might safely negotiate the waters about the power house without the aid of electric screens. Conferences were held with the engineers of the Stone & Webster Co. in Boston, and after thorough study it appeared that in fairness to the company immediate installation of the electric screens should not be required, but that a trial period of operation should be allowed to determine whether or not such equipment would be necessary.

Under date of September 4, 1931, the company obtained an amendment to their Federal Power Commission license providing for change in the plan of development. As regards safety, location and design and relocation of the dam have made possible the construction of a fish ladder offering many advantages over the structure originally proposed for the west channel.

The lower portion of the new ladder consists of a series of pools excavated in solid rock and the upper portion is of reinforced concrete exactly similar to the fish ladder at the power house, the grade being 1 to 10 and the pools being 10 feet long by 20 feet wide and providing for minimum depth of 4 feet of water. Under the new plan of development ultimate pond elevation has been set 4 feet lower than the height originally proposed.

Test of the Rock Island fish ladders will be had with the arrival of the 1932 run of Chinook salmon. By that time construction work will have been completed and the condition of initial development will exist.

North River project.—As commented on in our report for 1930, the North River project proposed the development of 37,500 horsepower by the construction of a concrete dam 112 feet high on the North River, in Pacific County, Wash. Following field inspections and conferences with officials of the Division of Fisheries, State of Washington, and the Pacific coast representatives of the power company, conferences were had in New York in January, 1931, with George Waesche, chief designing engineer of Sanderson & Porter, the engineers for the project, and details of fish-protective devices were worked out.

The plan proposes mechanical handling of both upstream and downstream migrating fish. For collecting the upstream-migrating fish a trap pool is located on the downstream side of the power house and directly over the tailrace. Entrance to this pool is provided for through an 8-foot weir gate which is float controlled to give automatic adjustment to tail-water level. This trap pool leads along the downstream face of the power house to a collecting pool at the toe of the dam. Into this collecting pool a hoisting bucket submerges and water, pumped from the tailrace, flows from the bucket and collecting pool out through the trap pool to serve as an attraction for the fish. When a sufficient number of salmon have entered the bucket it is hoisted on an inclined track up the face of the dam and dumped into the reservoir through a metal chute through which a flow of water is maintained.

The downstream-migrating fish are to be passed from the reservoir to tail-water through six 12-inch intake pipes connecting with an 8-foot standpipe on the downstream face of the dam.

Market conditions have delayed the construction of this project; but when work is undertaken, the action of the fish-protective devices is expected to draw considerable attention, for the operation of this project will afford the first large-scale test of the mechanical handling of both upstream and downstream migrating fish at high dams.

Ariel development.—This season saw the completion of the initial stage of the Ariel development, planned for an ultimate capacity of 180,000 kilowatts and situated on the Lewis River, a tributary of the Columbia River, in Washington. This fall the first 40,000-kilowatt unit went into operation and the initial test of some novel devices for fish protection was afforded with the arrival of the fall run of salmon. Here the dam is 180 feet high, and a carefully planned and comprehensive scheme of mechanical handling has been worked out in lieu of the construction of a fish ladder. The scheme involves trapping of the upstream-migrating salmon and the ripening, spawning, and rearing of these fish on a very large scale.

The feature of principal interest to designers of fishways is the trap pool for collecting the upstream-migrating fish. This pool extends along the downstream face of the power house directly over the tailrace. Entrance to this pool is afforded through three 10-foot entrance gates, which, by means of float control, automatically adjust themselves to tail-water level. Water pumped from the tailrace is discharged into the upper end of the collecting pool, and the attraction of this flow brings the fish into a hoisting tank, which in turn is loaded onto a truck for transporting the fish to the ripening ponds. The automatic gates have been found to function very satisfactorily and the fall run of salmon passed from the tailrace and into the trap pool without delay. The success of this type of installation for collecting upstream-migrating fish from tailrace waters is most encouraging and would seem to indicate that the solution of the problem of handling fish at high dams lies in the use of equipment of this kind.

Cascade Rapids projects.—At the present time there are two applications pending before the Federal Power Commission for preliminary permit for a power development at Cascade Rapids. Both projects proposed the development of large blocks of electric power by the construction of low dams and diversion works at the crest of Cascade Rapids in the Columbia River.

If such a development is ever undertaken here, very liberal provisions for fish protection should be insisted upon, especially in the matter of by-passing a large flow of water.

SALMONIDÆ OF NEW ENGLAND

Throughout the past year Dr. W. C. Kendall, senior ichthyologist of the bureau, has continued his studies of the salmonoid fishes of New England at the laboratory at Freeport, Me. Three distinct problems which have engaged his attention for many years have been continued. The study of the smelt of New England, except for observations in brooks and streams during the annual spring runs, has been temporarily laid aside in order to give attention to the completion of a study on the salmon, and for analysis of an extensive collection of trouts or chars of North America. As a result of these efforts in the interest of conserving the New England smelts, which have suffered marked depletion in recent years, the last session of the Maine Legislature finally passed regulations which it is believed will be effective in protecting the spawning runs of fish in fresh-water streams.

Landlocked salmon.—A manuscript on the landlocked salmon has been completed and submitted to the Boston Society of Natural History for publication as Part II of a memoir on the Salmonidæ of New England, and will be published as a quarto volume with handsome colored illustrations. This memoir pertains to the origin of the fish, the reasons for regarding it as a distinct species, and the known facts concerning its life history.

Concerning its origin, it is hypothetically argued that it is the product of the stage of fresh-water inundation following the last glacial period, when great estuaries and extensive inland areas of salt water were transformed by melting ice into inland fresh-water seas which gradually shrunk to the recent lakes naturally inhabited by the landlocked salmon. To those conditions the fish was compelled to adjust itself or " go fossil," so to speak. In fact, it might be regarded as a living fossil, which is implied in the name very appropriately given it by Malmgren, who called it *Salmo relicta.* It was left behind, as it were, by the receding marine environment and underwent physiological changes, one of which, perhaps, was the lost power of the young to undergo the transformation from parr to smolt, which immunizes the young of the sea salmon against any harmful effects in the transition from fresh to salt water.

In addition to all the other evidence, and there is considerable, that the lake salmon (the preferred designation) should be regarded as a distinct species, tables of percentages of proportional measurements were prepared and analyzed, and comparison made with like proportions of sea salmon. Some of the proportions show no differences whatever, excepting those due to sex, age, or size of the fish. In fact, it is only by averages that any of the proportions show differences, for they all overlap as they do with other species of Salmonidæ. There seems to be no possible way to describe an individual salmonid in terms of proportions by which a species can always be positively identified, but the *ensemble* of proportions, after elimination of variations due to sex, size, and age, when expressed in averages, tells the story. One authority on the sea trout of Europe (*Salmo trutta*) states, in effect, that it can not invariably be distinguished from *Salmo salar*, but there can be no doubt about their being distinct species.

In one set of proportions the landlocked salmon differs from the sea salmon (by averages) in exactly the same way that *Salmo trutta* does. This is in the proportion of the part of the body known as the caudal peduncle, which in the landlocked salmon averages much stouter than that of the sea salmon. The difference is most clearly shown by averages of the percental proportions of the least depth of the caudal peduncle to the distances from adipose and anal fins to caudal, as above mentioned. These proportions are greater in the male of both species than in the females, but the differences between the two species are maintained in both sexes.

Chars.—As in the case of other Salmonidæ, there has been no uniformity and stability of classification of the chars (Salvelinus and others). One reason for this is that no one has had an adequate view of the whole field, and, therefore, individual opinions have been based upon glimpses only of the situation outside of immediate surroundings.

In ichthyology generally, both European and American systematists have been more or less at variance in their interpretations and manner of expressing what they saw. In both countries, but more particularly in Europe, there have been two schools of systematic ichthyology. The tendency of one, which was the larger school, was to reduce the number of nominal species to its lowest terms. That of the other was to multiply them particularly as pertained to local faunas.

Thus there have been those who have regarded all the chars of Europe as constituting a single species, with local variations. Others, especially in Great Britain, have discerned in those variations characters regarded as of specific significance.

The single species advocates have extended their conception of that species to include chars of the Arctic regions of both Europe and North America whenever they have had the occasion to consider them. In America the same tendencies have obtained, but not always consistently.

Some years ago Doctor Kendall undertook to bring order out of the prevailing inconsistencies and attendant disorder as pertained to the chars and collected specimens from everywhere possible, far and near. The leaders of various Arctic expeditions were importuned to bring as many specimens as conditions permitted, but very few were obtained from any one locality. However, in the long run, with a few from here and there, a good many specimens have come to hand. The few specimens from scattered localities furnish links, which in time others may be able to unite in a more continuous chain, but it never can be complete, for many links are irretrievably lost through neglect. The fish are extinct, and, in one instance at least, there is not a preserved specimen in existence. It is the purpose of the present work on the chars to place all available links in the sequence that the study of them seems to indicate.

INVESTIGATIONS IN AQUICULTURE

Investigations in fish culture and related problems were considerably extended during the past year. This was made possible by an increase in the personnel and in the facilities for experimental work. These investigations include studies pertaining to all phases of fish-cultural activities. Naturally special attention is paid to problems relating to hatchery operations, but the work is by no means confined to this field. It is becoming more and more evident that fish-cultural activities must be extended to include the welfare of fish after they leave the hatchery. This necessitates a thorough knowledge of conditions in the waters in which fish are to be planted so that a scientific stocking policy can be developed which will insure an adequate return for the labor and money expended in fish-cultural operations. It is becoming apparent also that in many instances much can be done to improve conditions in natural waters so that they will support a larger fish population than at present. Owing to limited personnel it has been impossible to devote much attention to these larger problems in the past; but with the increased facilities now available, it is hoped to place more stress on work in this field.

The fish-cultural stations at Fairport, Iowa, Pittsford, Vt., and Leetown, W. Va., which are operated primarily for experimental purposes, will serve as headquarters for investigators who will not only devote their time to carrying on investigations at their respective stations but will also conduct field studies in the streams and lakes of the surrounding territory.

It is not intended, however, to limit investigations to these experimental stations, but investigators will be stationed at hatcheries in various parts of the country where they will carry on experiments and studies dealing primarily with local problems. These investigators will also be available to render assistance to both Federal and State hatcheries in their respective territories.

The activities of the Fairport station are almost entirely confined to the study of problems connected with pond-fish culture, while those of the Pittsford station are limited to trout culture and its attendant problems. The new station at Leetown, W. Va., is designed for work with both trout and the so-called warm-water fishes; but, owing to insufficient funds to develop the pond system, the work for the present will be devoted largely to trout, especially rainbow and brown trout, which are not dealt with to any extent at the Pittsford station. Arrangements have also been made to station an investigator temporarily at the State hatchery, Hackettstown, N. J., where a number of bass ponds have been made available for experimental work.

POND-FISH CULTURE

FAIRPORT STATION

The facilities of this station, which is operated under the direction of Dr. A. H. Wiebe, have recently been increased by the construction of a number of new ponds which were in use for the first time during the summer of 1931. Several of the old ponds have also been rebuilt, which has greatly increased their efficiency. The main water supply is pumped from the Mississippi River into a reservoir, whence it is carried by gravity to the ponds. There is also a limited supply of well water which is available for use in several of the smaller ponds.

Black bass.—The bass production was not as satisfactory as in previous years, owing to exceptionally cold weather in the spring, which interfered with spawning and caused the fish to leave the nests shortly after the eggs were laid. The cold weather also delayed the spawning of many of the fish, causing more variation than usual in the size of the fry. As a result, there was an increase in cannibalism, and the percentage of fingerlings which survived until fall was considerably less than usual. The decreased yield in numbers was partially offset by the better quality of the fingerlings, which averaged larger than usual. There was an exceptionally large number of fingerlings around 6 to 7 inches in length.

One of the greatest problems in bass culture is to reduce the number of these large fingerlings. They are undoubtedly cannibals and are probably responsible for a large part of the losses which normally occur during the summer. The use of forage minnows tends to produce a more uniform growth in the fingerlings, and the percentage of exceptionally large fish is considerably less, but during the past season this was in large part nullified by the abnormally long spawning season, resulting in fry differing greatly in age which afforded unusually favorable conditions for cannibalism.

In spite of the unfavorable conditions the production of fry by 2-year-old bass was better than expected, the average number per female being about 1,800. These fish averaged less than one-half pound in weight in the spring, but more than doubled their weight during the summer.

A comparison of golden shiners and blackhead minnows as forage for smallmouth bass showed that, as in the case of the largemouth, the shiner is much superior for this purpose. In a pond stocked with shiners the yield of smallmouth fingerlings was at the rate of 12,575 per acre, while in adjoining pond stocked with blackhead minnows but in every other way treated the same the yield was only 7,215 per acre.

Crappie and bluegill sunfish.—Several ponds were stocked with crappie and bluegill sunfish, and the results agree with those of previous years in indicating that this is an excellent combination

In this case the bluegills serve as forage fish for the crappies, and appear to be better suited for this purpose than either the golden shiner or the blackhead minnow. The best production of black crappie fingerlings was at the rate of 20,562 per acre. In addition there were 1,430 exceptionally large bluegills, making the total production of crappie and bluegills approximately 22,000 per acre.

As regards weight, however, the best production was obtained in a smaller pond, where the yield of black crappie and bluegill sunfish was at the rate of 260 pounds to the acre. This is the largest yield of strictly game fish which has been obtained at Fairport. In comparing these figures with the production at other hatcheries, it should be remembered that no food was added to either pond other than a small amount of fertilizer and that the output represents the actual amount of fish flesh produced in the pond.

The results in both bass and crappie ponds indicate that a fairly abundant growth of submerged vegetation is required for best production. In all ponds showing a satisfactory yield of fish there was a good growth of this type of vegetation, but ponds with scanty vegetation or with a predominant growth of emergent plants were less productive.

Forage minnows.—Observations on the blackhead minnow have yielded some very interesting results. It was found that the activities of the male on the nest not only serve to protect the eggs from various enemies but also to keep up a continuous circulation of water and that the eggs soon die when the male is removed. This minnow is very prolific and a single female may deposit several thousand eggs during the season. One female under observation deposited no less than 4,414 eggs. These eggs were not all deposited at once but at 11 different times during the summer. A surprising result was the discovery that young blackheads hatched early in the season may mature and spawn when only 2 months old.

Effects of high oxygen concentrations and changes in pH.—A series of experiments have been conducted by Doctor Wiebe to determine the effects on fish when the atmosphere above the surface of the water is replaced with pure oxygen. The use of oxygen instead of air when fish are to be shipped long distances is constantly increasing, but the technique employed still leaves much to be desired. Ordinarily the oxygen is forced into the water at the bottom of the container and allowed to escape from the surface. This, of course, results in a great waste of oxygen. It is also claimed by some fish culturists that the gills are affected by the oxygen and may become seriously inflamed.

In view of these facts it was decided to try the effects of high concentrations of dissolved oxygen by placing the fish in a closed container and replacing part of the water with oxygen at various pressures. Several species of fish were used in these experiments, including large and smallmouth black bass, crappie, bluegill sunfish, goldfish, and golden shiners. It was found that all these fish could tolerate an atmosphere of pure oxygen over the surface of the water even when pressures as high as 10 to 15 pounds were maintained for a period of 24 hours. Dissolved oxygen concentrations as high as 41 parts per million were obtained in these experiments without injury to the fish. It was also found that sudden transfers from high to low oxygen concentrations, and the reverse, had no injurious effects. In several instances fish used in these experiments were kept under observation for several weeks, but in no case were there any indications of injury to the gills.

The experiments also showed that fish can tolerate a high carbon-dioxide content, provided there is also a high concentration of dissolved oxygen. In some instances the CO_2 content rose to over 50 parts per million without any apparent detrimental effect.

These results have a very practical bearing, since they indicate that it will be possible to ship fish for long distances in closed containers with an adequate supply of oxygen stored under pressure. Further experiments in this direction are planned for the near future.

Experiments on the effect of sudden changes in hydrogen-ion concentration (pH) on several species of fish show that they are able to withstand rapid and extensive changes without any injurious effects. Goldfish and green sunfish tolerated rapid changes from pH 7.2 to 9.6 and from 8.1 to 6.0. Fingerling bass were apparently unaffected by rapid changes from pH 6.1 to 9.5 and also by a similar change in the reverse direction. The experiments show that these species of fish can tolerate the entire pH range of most unpolluted lakes and rivers, and hence that hydrogen-ion concentration has very little if any direct effect on the distribution of these fish in nature. The results also indicate that no bad effects need be anticipated in stocking natural waters when the fish are suddenly transferred to a water with a quite different pH from that in which they were reared.

UPPER MISSISSIPPI WILD LIFE AND FISH REFUGE

Investigations in the sloughs of the Mississippi River bottoms in the vicinity of Trempealeau, Wis., were continued during the summer of 1931 under the direction of E. W. Surber.

As was the case at the Fairport station, three periods of unseasonably cold weather during the spawning season proved disastrous to the eggs of the black bass. The number of fry which hatched was so small that it was impossible to utilize most of the sloughs which had been prepared for stocking with bass. Only about 40,000 fry were obtained; and owing to unfavorable conditions in the sloughs as a result of the abnormally hot, dry summer, only 5,330 fingerlings were recovered in the fall. Conditions were more favorable for bluegill sunfish, and Long Pond, which was stocked with 140 adults of this species, produced 40,000 fine fingerlings. A much higher production was obtained in Pickerel Slough, which yielded 320,000 fingerlings from 135 adults.

Principally on account of their feeding habits, gizzard shad have been frequently recommended as an ideal forage fish. It has, however, been impossible to get these fish to propagate in small bass ponds, several attempts of this nature at Fairport having been attended with failure. In the hope that the sloughs would afford more favorable conditions, two ponds were stocked with large adult shad early in the spring. These fish spawned successfully and large numbers of young were produced in both ponds. They grew very rapidly, however, but it is questionable if they would make a satisfactory food for young bass of the same season. On the other hand, it is possible that the gizzard shad will prove of value for use with yearling and older bass.

Determinations of soluble phosphorus, nitrite, and nitrate ammonia, organic nitrogen, and hydrogen-ion concentrations were made at 10-day intervals throughout the summer in 11 sloughs. Plankton samples were collected every 10 days, while bottom samples were taken monthly in the same sloughs. A report covering these and similar observations in the sloughs during previous years will soon be ready for publication.

Two sloughs were fertilized regularly with sheep manure and superphosphate. Although no bass fry were available to stock these ponds, the effects of the fertilizer upon the bottom fauna and plankton were studied in detail.

Whether connected directly with the river or not, the sloughs are dependent on the river for their water supply; and when the water is exceptionally low throughout the summer, as in 1931, conditions may become very unfavorable for game fish. On the other hand, during exceptionally high flood stages it is frequently impossible to prevent the fish from escaping into the river. For these and other reasons it is felt that under present conditions it is not economically feasible to utilize these sloughs for the propagation of fish and that efforts in this direction had best be abandoned for the present. A potent factor in reaching this decision is the fact that with the construction of the 9-foot channel, which is scheduled for the near future, conditions along the river will be so changed that utilization of the sloughs for fish cultural purposes will present quite different problems from those confronting us at the present time.

HACKETTSTOWN STATION

During the spring of 1931 arrangements were made for cooperative investigations in bass culture to be conducted at the State hatchery, Hackettstown, N. J. Accordingly, Dr. Paul R. Needham was detailed to the Hackettstown hatchery in June and immediately began systematic observations on a number of ponds in which bass were being reared. Although the investigations were not begun until late in the season, some very interesting results were obtained in two ponds which had been used for holding trout during the winter.

One pond which had been used for eight winters as a trout pond was much richer than the other, the bottom being covered to a depth of several inches with a layer composed of trout excrement mixed with silt and muck. After the trout were removed a dense growth of Daphnia developed. Both ponds were heavily stocked with largemouth bass fingerlings late in June and the fish were allowed to remain until August. In the richer pond the growth of Daphnia was so abundant that but little diminution in their numbers was noted over the entire period of 38 days that the bass remained in the pond, so that there was always plenty of food available. In the other pond, however, the growth of Daphnia was insufficient to supply the needs of the bass, and it was necessary to introduce large quantities from another pond. In both ponds there was a large growth of midge larvæ and sowbugs in addition to the Daphnia.

An examination of the stomach contents of fish from both ponds showed that approximately one-half the food consisted of Daphnia, the remainder being made up mostly of midge larvæ and sowbugs. The fish in both ponds made a rapid and remarkable uniform growth, the average increase in weight being about 1 gram a week. The maximum variation in length between the largest and smallest specimens was only 19 millimeters, while in other ponds variations in length as great as 111 millimeters were recorded.

These results are of great interest for comparison with those obtained at Fairport, since the methods employed were very different. The production of approximately 15,500 fingerlings per acre was no greater than has been obtained at Fairport, but the growth was more rapid, due, no doubt, to the heavy fertilization, which greatly exceeded anything which has been attempted in the ponds at that station.

The results also show that when sufficient numbers of Daphnia and insects are available bass can be reared successfully to a length of 3 inches or more without the use of forage fish. It is doubtful, however, if under ordinary conditions these animals can be raised in sufficient abundance through the summer to supply the needs of fingerling bass when the ponds are heavily stocked.

During the season of 1932 it is planned to carry on a series of experiments at Hackettstown to determine the relative value of Daphnia as the principal item of food throughout the summer as compared with forage minnows.

TROUT CULTURE

PITTSFORD STATION

As previously stated, the investigations relating to trout culture have been conducted at the experimental hatchery at Pittsford, Vt., which is operated under the direction of Russell F. Lord. These investigations include feeding experiments with both fingerling and yearling trout, selective breeding for the purpose of developing a superior strain of brook trout, and studies on trout diseases. Some field work is also being carried on, which includes a study of the natural food of trout throughout the year and the tagging of trout liberated in certain streams.

Construction work during the past year was confined to extensive repairs to the hatchery, which was in very bad condition, and minor repairs to several other buildings.

Feeding experiments.—As in previous years, fingerling brook trout from the same general stock of eggs were divided into lots each containing 1,500 fish. Each lot occupied a standard hatchery trough and was carried on an experimental diet from May 5 to September 3. Throughout the summer samples of fish were counted out and weighed at 2-week intervals.

Emphasis was laid on the further testing of dry products, which appear to offer the best possibilities as trout foods. A record was kept of the amount of food fed each lot of fish and its cost. In every case the fish were fed all they would eat without waste. No tests were made of straight meat diets, since sufficient data on these foods have already been secured. Beef liver was in most instances used in combination with the dry products, but with salmon eggs it was thought desirable to use other meats as well. Since beef liver has been shown to give the best growth of any meat ordinarily used at hatcheries, it was fed to the control lots and was the only meat used straight.

It is interesting to find that the growth obtained with mixtures of meat and suitable dry products has each year approached more closely or even surpassed that obtained in the controls, and this year all the diets, with three exceptions, gave a greater growth than beef liver. The results show very clearly that there are now a number of dry products which, when fed in combination with fresh meat, are superior to a straight meat diet and cost considerably less. In other words, by the use of dry products it is possible to produce better fish for less money than can be produced on the standard hatchery diets in common use.

The outstanding feature of the feeding experiments for 1930 was the excellent growth and high color secured with dry salmon eggs. For this reason it was planned to give the salmon-egg meal a thorough test in the 1931 experiments and eight rations were made up with the meal incorporated in various proportions. In general the results of these experiments fully confirmed the conclusion reached in 1930—that in proper combinations salmon-egg meal makes the best trout food now available. As is to be expected, the best results were obtained with a mixture of salmon-egg meal and beef liver. The meal was used at 30 and 50 per cent levels, but the results show that 50 per cent of salmon eggs is too high for small fingerlings, although it can be safely used after the fish reach a length of 3 to 4 inches. With small fingerlings a considerable percentage of the meal is uneaten if more than 30 per cent is used in the mixture. In general the smaller the fish the greater the difficulty in feeding dry products, and in ordinary hatchery practice there is probably little to be gained in attempting to feed such products before the young trout are about 2 inches long.

The fish fed a mixture of sheep liver and salmon eggs made a slightly greater growth than those on beef liver mixture, but the mortality was higher. Data secured in previous experiments indicate that sheep liver is inferior to beef liver for brook trout when fed straight, but that in combination with certain dry products it gives much better results than when fed alone. Pig liver when used with salmon eggs was somewhat inferior to either beef or sheep liver, but owing to its lower cost it may be found advisable to use it with the larger fingerlings. For some reason a mixture of pork melts and salmon eggs proved a complete failure—the fish refuse to eat it and suffered such a heavy loss that the lot was discontinued early in July.

The superiority of salmon eggs rests not only on its ability to produce rapid growth but also on the fact that fish reared on this product show exceptional vigor and remarkably brilliant coloration. As might be expected, the latter is more marked in yearling than in fingerling fish, but is very noticeable at any age. It has also been found that an equally marked improvement in the color of rainbow and black-spotted trout follows the use of salmon eggs. This was especially noticeable in a lot of yearling rainbows, which showed a remarkable development of red and orange hues before the end of the summer.

Fish meals of various kinds have been used extensively in previous experiments and, on the whole, have given quite satisfactory results. This is especially true of the vacuum and steam-dried meals, which are superior to flame-dried and more uniform in quality. A haddock meal dried by a new process at low temperature gave excellent results in combination with beef liver. In fact, this mixture gave the best growth that has been obtained with any fish meal and was only slightly behind the salmon eggs in this respect. The mortality was also very low.

In previous years several attempts have been made to carry experimental lots through the summer on dry foods alone, but all such attempts have ended in failure. During 1931 another attempt was made to keep fingerling trout on a ration containing no fresh meat. These fish were fed a ration composed of 58 parts dextrin, 34 parts haddock meal, and 8 parts dry beef liver. The haddock meal and beef liver were dried by the special low-temperature process referred to above. The fish made a good growth, and for the first time in the history of these experiments it was possible to carry them through the summer without feeding any fresh meat. The mortality, however, was higher than normal, and it is not believed that the use of this ration for any length of time is to be recommended.

In addition to the experiments with fingerling trout, 20 lots of yearling brook trout were placed on experimental diets May 27 in small outdoor pools. These experiments were to have been continued through the summer, but owing to an unsuitable water supply this was found to be impossible. Unlike the hatchery troughs which are supplied with spring water, the only supply for these pools is from a neighboring brook. On account of exceptionally hot, dry weather early in the summer, the temperature of the brook rose to 72° F. This brought on an epidemic of furunculosis, which caused such a heavy mortality—in one lot reaching 86 per cent—that the experiments were discontinued on July 9.

Although these experiments with yearling brook trout were carried on for such a short time that the results are of little value, there is one aspect of the case which is of more than passing interest. During the previous summer there was some evidence that the inclusion of salmon eggs in the diet tended to make the fish less susceptible to furunculosis, and experience with the yearling trout strongly supports this conclusion. With one exception, the fish which showed the lowest mortality were on diets containing 50 per cent of salmon eggs. The single exception was a lot fed a mixture of equal parts salmon eggs and pig melts, in which the mortality was double that of any other lot receiving an equal amount of salmon eggs. As previously mentioned, this ration resulted in such heavy mortality with fingerling trout that it was discontinued early in the season. There can be no doubt that the lower mortality in the lots fed salmon eggs was due to the food, since in all other respects the experimental lots were treated alike.

Breeding experiments.—The work on selective breeding, which was started several years ago, has been continued along the same general lines as in previous years. Although it will be some time before the full possibilities of this work will be evident, each year shows a marked advance in the results attained. Progress would have been even more rapid had it not been for the occurrence of furunculosis, which has caused serious losses among the selected fish. It is hoped that eventually it will be possible to develop a strain of trout more resistant to this disease than the average fish, but it is too early to predict how successful this attempt will be.

As in previous years, a number of selected fish were mated, and the progeny of each pair will be reared separately until it is determined if they possess any points of superiority. In addition to selecting such characters as fecundity, rapid growth, vigor, and resistance to disease, a special attempt is now being made to develop an early-spawning strain of fish. Such a strain would possess many advantages, especially in the extreme Northern States. During the fall of 1931 eggs were taken from 56 pairs of selected fish. Several of these showed an exceptionally high percentage of eyed eggs and one 4-year-old female yielded 2,557 eggs, 97 per cent of which eyed.

In this connection it is interesting to note that the average size of fingerling brook trout at the Pittsford station has increased each year from 1,630 grams per 1,000 fish in 1928 to 5,189 grams in 1931. Of course, this increase in size is partially due to the use of better rations, but that the greater part is due to improvement in stock as the result of selection is evident from a comparison of the experimental lots fed beef liver as shown in the following table:

Year	Weight in grams per 1,000 fish	Date when weighed
1928	2,174	October 15.
1929	2,893	September 24.
1930	3,707	September 3.
1931	4,421	September 3.

We can not, of course, hope to increase the size of trout fingerlings indefinitely, but there can be no question that by constant selection of the brood stock and by the use of improved foods it will be possible to produce trout of catchable size in a much shorter time than at present.

LEETOWN STATION

Construction work at the new experimental station at Leetown, W. Va., was started in the spring of 1931. This station is located on a tract of approximately 150 acres, watered by several springs with a combined minimum flow of over 2,000 gallons per minute. It is planned to operate this plant as a trout and pond station; but owing to lack of funds for developing the property, it will be impossible to do any pond-cultural work at present. Eventually, however, there will be between 75 and 100 acres of ponds devoted entirely to experimental work with warm-water fishes.

The main building, which is designed primarily for a trout hatchery, is now practically completed. This building is constructed of native limestone and is approximately 125 feet long by 40 feet wide. The middle section contains 60 standard hatching troughs on the ground floor, with offices, library, photographic room, and storage rooms on the second floor. Wings at each end of the building contain the laboratories and a public aquarium. Immediately in the rear of the main building is an old gristmill which has been remodeled to serve as a garage, carpenter shop, and meat room. A short distance below the hatchery there is adequate space for the construction of a series of trout pools which will be used for experimental purposes and also for holding brood stock.

The trout work at this station will be devoted primarily to rainbow and brown trout, although brook trout will also be reared in considerable numbers. The Pittsford station, however, will continue to serve as headquarters for work with this species. As soon as sufficient brood fish have been reared it is planned to undertake selective breeding with rainbow and brown trout along the lines which have given such promising results with brook trout. It is also planned to undertake extensive feeding experiments, which will be continued throughout the year. In accordance with this policy approximately 500,000 rainbow, brown, Loch Leven, and brook trout have been hatched at Leetown, and a large percentage of the young fish will be held over the summer. This will insure an adequate supply of material for experimental work.

FISH DISEASES

Herring disease.—An investigation of a disease of the herring in the Gulf of Maine was begun early in 1931 and continued through the summer. This investigation was carried on in cooperation with the division of inspection of the Maine State Department of Agriculture, and the greater part of the expenses of the investigation was defrayed by the State.

During the winter and spring of 1931 a laboratory was maintained at Eastport, Me., where investigations were carried on by Dr. Frederic F. Fish and George E. Daniel. Later the laboratory was transferred to the Bureau of Fisheries station at Boothbay Harbor, Me., where much better facilities were available than at Eastport.

As a result of these investigations it was found that the disease in the herring is caused by a fungus of uncertain affinities known as *Ichthyosporidium* or *Ichthyophonus*. In addition to the herring (*Clupea harengus*), the parasite has been found on the flounder, alewife, and smelt. The herring, however, appears to be the natural host, infection in other species being apparently accidental.

The parasite occurs in all parts of the body, but is especially abundant in the heart, liver, and lateral-line muscles, and forms large, spherical, multinucleate cells, which are surrounded by a thick membrane. These spherical bodies or cysts occur in groups bound together by a heavy connective-tissue capsule.

Further development of the cysts takes place by the formation of a small circular opening in the wall, through which the protoplasm extends to form a short, branched hypha covered with a thin transparent membrane. The contents of the hypha break up into a number of discrete bodies, the structure of which is practically identical with that of the mother cyst. After the formation of the secondary cysts the tip of the hypha breaks open and the cysts are liberated. Such a process results in the liberation of a large number of bodies into the musculature of the fish, each of which can repeat the process by which it was produced.

In some cases instead of forming hyphæ the contents of the cyst may divide into a number of daughter cysts, similar to those produced in hyphæ, by a process of endogenous budding. Later the cyst wall ruptures and the daughter cysts are set free in the surrounding tissues. Once the infection is established, the mode of diffusion of the parasite within an organ is not difficult to understand, but the means by which the infection spreads from one organ to another within the host is not so evident. It seems quite reasonable to assume that migration occurs through the circulatory systems, either lymph or blood, but so far it has been impossible to demonstrate such a process.

As a result of the development of the parasite within the host the surrounding tissues become necrotic, and in severe infections may disintegrate to form a puslike material which may be eliminated through an opening in the skin of the fish.

The development of the parasite is very slow, and it probably requires weeks or even months for it to become disseminated throughout the body of the host. In many cases the multiplication and dissemination of the parasite through the tissues appears to proceed gradually until every part of the body is affected and the host becomes so weakened that it eventually dies, or more probably is caught by one of its numerous enemies. In some instances even badly infected fish may completely recover and groups of parasites in various stages of resorption are by no means rare. The extent, however, to which normal recovery takes place is unknown at present.

Transmission of the parasite from host to host is probably effected by the heavy-walled cysts which are thrown off in large numbers through openings in the skin of infected fish. These cysts float about in the water and could readily be swallowed by another fish. There is no reason to believe that an intermediate host is involved in transmission of the infection. The evidence at hand indicates that the infection is much more prevalent among herring that have been in inshore waters for some time where there are better opportunities for the spread of the parasite. Apparently fish in offshore waters are usually relatively free from the disease.

Trout diseases.—Studies on furunculosis were continued by Doctor Davis at the Pittsford station. An investigation of an undescribed eye disease which was quite prevalent in several lots of fingerling trout was also begun. The first indication of this disease is a slight congestion of the blood vessels on the lower side of the eyeball. A little later irregular elevations appear on the cornea due to proliferation of epithelial cells. Eventually the entire cornea becomes thickened and opaque and more or less distended due to the accumulation of fluid between it and the iris. In some cases the cornea may disintegrate, allowing the fluid to escape into the surrounding water. In advanced stages of the disease the lens disintegrates and the entire eyeball becomes greatly shrunken.

Only the eyes are affected, and numerous instances were observed where the fish became totally blind but were apparently perfectly healthy in every other respect. The cause of the disease has not yet been determined.

It was found that the spread of the disease was checked by transferring the fish from hatchery troughs to outdoor raceways. After the transfer the eyes of fish already affected continued to degenerate, but no new cases of the disease could be found.

Parasites of Great Lakes fishes.—During October and November, 1931, Dr. Frederic F. Fish made a preliminary survey of the extent of infestation with the larval stage of the cestode *Triaenophorus robustus* among fishes of the Great Lakes. This parasite was found to present a serious problem in the tullibees and whitefish of Lake of the Woods, the lake herring and whitefish of Rainy Lake, the lake herring of western Lake Superior, and the lake herring and chubs of the Green Bay region of Lake Michigan. The parasite was found to a lesser extent in the lake herring taken at Cheboygan, Saginaw Bay, and Marquette, Mich. Other fish, including the pike-perch, pike, pickerel, yellow perch, sauger, black sucker, redhorse sucker, bullhead, carp, crappie, and cisco, were examined in several localities and were found to be uniformly negative.

Lake Erie was found to be free from the parasite. Lake Ontario was not visited, but there is no reason to suppose that the parasite occurs there.

CALIFORNIA TROUT INVESTIGATIONS

Early in the year arrangements were made with the California Division of Fish and Game for a cooperative trout study in that State. In March a meeting of the members of the bureau's staff who are working on trout propagation was held in Washington, and an outline was made of those lines of investigation which promised to be of most help in maintaining the western game fishes under the constant increase in angling which has followed the extension of roads and the development of the automobile.

Three major lines of investigation were proposed:

(1) A study of the development of a domestic brood stock as a source of eggs.

(2) Investigation of the problems involved in raising larger fish for planting.

(3) The development of a stocking policy through stream surveys.

Active work on this program was started in May. This preliminary work has included a survey of certain streams with a view to selecting those which are suitable for experimental work. In the course of this work streams have been studied in the four geographical groups into which the streams of the State may be divided, viz, the streams of the eastern slope of the Sierras, of the western slope of the Sierras, of southern California, and of the Coast Range from Monterey north to the Oregon line.

Data have been gathered also regarding the development of selected brood stock as a source of eggs. This has included a study of the present brood stock in the State and the characteristics of the wild stock from which eggs are now derived.

It was not possible to start selected brood stocks during the present season, as no sites were available for holding such fish, but plans have now been formulated which will make it possible to carry on this work during the coming year. There is a particularly pressing need for the development of a source of brown-trout eggs in southern California, and it is now planned to use for this work certain storage reservoirs which are not subject to great fluctuations in level.

The development of a brood stock and the raising of larger fish for planting are both largely dependent upon the availability of suitable water. This problem is particularly acute in California, where practically all the water at low elevations is stored or diverted for irrigation.

An excellent site for this type of work has been developed at Hot Creek, in Mono County, which is on the eastern slope of the Sierra Nevada Mountains. Warm springs arise along the course of this stream which have a constant temperature of 60° F. and a flow of about 30 second-feet. The gravel bed of the stream is covered with water cress and other aquatic plants. Fish food is abundant in the form of the amphipod *Gammarus ramellus*, which is present in numbers up to 1,000 per square foot of stream bottom. The terrain is such that ponds can be constructed and maintained at low cost. During the latter part of the year two experimental ponds were constructed at this place. Due, however, to a heavy fall of snow in December, it was impossible to stock these ponds during the present year. There is sufficient water at Hot Creek to allow of the establishment of both brood stock and fingerling ponds.

Two streams have been selected for the study of the life history of the steelhead, including the study of the migratory movements of the young fish through marking and by monthly sampling in the upper parts of the streams and in the lagoons. This work has been somewhat hampered by exceptionally heavy rainfall and the consequent flooding of the streams, but work is also being done on the migration, growth rate, and egg production of the adult fish through tagging.

LIMNOLOGICAL INVESTIGATIONS IN THE NATIONAL PARKS AND FORESTS

Following conferences early in the year 1931 the Bureau of Fisheries announced recognition of its responsibility in stocking the public domain with food and game fishes, and plans were made for active cooperation with the Forest and Park Services to fulfill that responsibility in a competent manner. As its specific duties the bureau proposed to undertake scientific surveys of forest and park waters as a basis for drafting a national program of fish planting, and plans were made for the Forest and Park Services to cooperate with the bureau in the planting of fish in accordance with an orderly plan of stocking. To carry this out the bureau proposed to organize in each of the national-forest areas of the United States investigations under a competent biologist who should conduct and supervise stream and lake surveys in the waters of the public domain, and who should develop therefrom a rational policy of stocking such waters with fish.

A preliminary survey of the lakes and streams of Wasatch National Forest in Utah was conducted during the summer of 1930, and in June, 1931, a permanent investigator of the bureau, Dr. A. S. Hazzard, was placed in charge of stream surveys in the intermountain region.

The primary purpose of these studies is to collect basic physical, chemical, and biological data on the lakes and streams of these areas and to interpret these data in the form of systematic stocking programs to meet the increasing demand for game fish in public waters. Along with this immediately practical program, fundamental studies concerning production of fish food and fish in unit areas of water of different types are being planned. The ecology and distribution of the little-known fishes of the Rocky Mountain region are being investigated as a part of the survey work in these areas.

WASATCH FOREST INVESTIGATION

The Wasatch forest has been designated as an experimental area in which fish-cultural experiment and stocking programs can be carried out to the ultimate benefit of the entire Rocky Mountain region. As a basis for this work, a preliminary biological survey of representative lakes and streams was undertaken. Collection of the field data during the seasons of 1930 and 1931 was made by Prof. Vasco M. Tanner, of Brigham Young University, who, with a staff of four assistants, spent the months of July, August, and September in a reconnaissance survey of the representative lakes and streams of this area. During the first season 86 lakes and a few streams were examined. The summer of 1931 was devoted primarily to a study of the principal stream systems, although some lake study was also carried out. A total of 107 lakes and 34 stream systems were examined during the two seasons.

Lake studies.—The majority of the lakes of the Wasatch Forest lie at elevations from 9,500 to 11,500 feet. The growing season for most forms of aquatic life, including the trout, probably does not exceed four months, judging by the fact that the ice does not disappear from the majority of the lakes until June and begins to form early in October.

Although locally termed as lakes, these bodies of water are all relatively small, varying in size from 1 to 160 acres and having a total area of only 1,715 acres. They are for the most part shallow lakes of glacial origin.

The entire drainage area being in pre-Cambrian quartzite, the water is extremely soft, varying in pH from 4.9 to 5.5, with a bicarbonate content of from 5.5 to 15.2 parts per million. Dissolved oxygen of the surface water varies from 6.2 to 8.9.

The lakes studied, classified according to the type of shore, are: Rocky, moorland or boggy, and reservoir lakes. Although intermediates between the first two classes are common, the latter type, though a man-made class, is quite distinct in chemistry and biota. The first class is characterized by rocky shores and bottom; shallow, clear water rich in oxygen and exceedingly low in carbonates and a sparse fauna and flora. The boggy-shore type is found in stream valleys, usually surrounded by boggy meadows. These lakes have mucky bottoms, and the oxygen tends to be reduced in the deeper waters due to the decomposition of organic matter and to the small size of tributary streams. A fair abundance of a few species of organisms makes up the food supply. The reservoir type is usually the result of damming originally boggy-shore lakes to increase their storage area for irrigation purposes. Great fluctuation in water level occurs in contrast to the fairly constant area of the other types. Food of the bottom and plankton types is quite abundant at low-water stages, probably due to concentration with decrease in area.

In general, all of these lakes contain a limited supply of food, probably due to the short growing season and the low lime content of the waters. Some of the rock-rimmed lakelets at the higher altitudes were considered unsuitable for trout because of the extremely limited food supply. The boggy-shore lakes were held to be unsuitable if tributary streams were lacking, and the process of filling had advanced too far. However, a good proportion of these types, as well as the type intermediate between them, should provide for a limited number of trout. The reservoir type is considered suitable for a moderate number, depending upon the level to which the waters are reduced.

The only fish native to the region and naturally present in lakes not separated by impassable falls from lower waters is the cutthroat trout, *Salmo pleuriticus* Cope. No forage fish such as minnows and whitefish were observed in any of the lakes, and their introduction is considered as a possible means of improving production. Many of the lakes were formerly barren of all fish life. Rainbow, eastern brook, and Yellowstone cutthroat have been introduced into some of these lakes, and where the plantings were moderate have made good growth. Food studies of 153 specimens of trout of lakes show no noticeable difference in diet among the species represented, the food taken by native cutthroat, eastern brook, and rainbow consisting of 25 per cent terrestrial and 75 per cent aquatic organisms. Midge larvæ, pupæ, and plankton crustacea comprised the bulk of the aquatic food; ants, the bulk of the terrestrial food.

Stream studies.—Five drainage systems are located in the Wasatch Forest: Provo, Weber, Bear, and Duchesne Rivers and Rock Creek. The headwaters of these streams are very rapid and the pools are narrow, shallow, and infrequent. The pH varies from 5.1 to 5.6 and the bicarbonate content from 7.3 to 12.6 parts per million; food organisms are extremely scarce. In their lower reaches, near the forest boundaries the gradient becomes less steep, the pools improve in type and abundance, and the fish food undergoes a marked increase. The latter appears to be associated with a marked change in the solution content of the waters due to the occurrence of limestone outcrops within the drainage area at the lower elevations. The bicarbonate content of the streams below 8,500 feet elevation varies from 18.3 to 56.7 parts per million.

Stomach examinations of stream trout showed a larger percentage of terrestrial food in the case of cutthroat trout and eastern brook trout than was consumed by these species in the lakes. As in the case of lake fish, ants formed the bulk of the terrestrial food. Caddis larvæ made up 35 per cent of the food of stream trout, with mayflies, midges, and stoneflies next in order of importance in the aquatic food list. One sculpin and one young trout had been taken by these fish.

The principal conclusions to be drawn from the stream studies is that stocking of trout should be largely confined to the lower waters where food and pool conditions are suitable, but detailed tables of the species, sizes, and numbers of fish and the frequencies of planting in the various waters have been prepared for the use of the fish-cultural staff.

TETON NATIONAL PARK INVESTIGATION

The biological survey of the waters of the Grand Teton National Park is the first of a series planned for the national parks in order that systematic stocking plans for these waters may be devised.

Field work was conducted from July 20 to September 20. An exchange of personnel was effected between the members of the Wasatch and Teton survey parties for a part of the season in order that the work in these areas might be better coordinated.

Six lakes, from 60 to 1,360 acres, with a total area of 3,443 acres, afford the principal fishing in this park. The streams within the park are too small and precipitous to afford much angling, although they are extremely important in furnishing the only successful spawning grounds for the cutthroat trout of the lakes.

Studies of aquatic plants, plankton, littoral, and benthic organisms were made. Studies of temperature, depth, type of bottom, and chemical relations were undertaken. The fish population was investigated, and collections of fish stomachs and scale data secured from 145 specimens of cutthroat trout. A preliminary survey of Jackson Lake was also made which included extensive soundings and fish collections.

A systematic stocking plan is being formulated for these waters based upon the data secured during this survey.

With two exceptions, the lakes of this area were found to contain considerable water over 50 feet in depth. Abundance of oxygen and small amounts of carbon dioxide were found in all but one of these lakes. The large volume of the cold tributary streams and the scarcity of organic material are responsible for this condition. The waters of the park are acid for the most part and contain small quantities of bicarbonates, with the exception of the southernmost lakes and streams which drain some areas of limestone formation in contrast to the igneous and metamorphic rock which make up the drainage areas of the more northern waters. A marked superiority in the quantity of aquatic fauna and flora was noted in these more southern waters.

The present reduction in the trout population in the Teton lakes is believed to be due to the increase in angling, lack of sufficient artificial plantings, and to the scarcity of suitable spawning beds for the cutthroat trout. Gill netting, seining, and observation failed to show the presence of young trout, smaller than 7 inches in the lakes, although fry and fingerlings were common in the inlets and outlets of the lakes. Impassable falls near the lakes limit the spawning areas to a few hundred yards in most cases. Consistent stocking should show a marked improvement in the angling in these lakes in the near future.

Studies of 109 cutthroat trout of lakes and 36 of streams show a marked difference in the food habits of this species, depending upon size and environment. Fish are unimportant in the diet of stream trout of the sizes taken, due in part to the scarcity of this type of food here. Aquatic insects formed approximately 75 per cent of the food; terrestrial insects 25 per cent. In lake fish aquatic insects formed 3 per cent by volume, terrestrial insects 7 per cent, plankton crustacea 10 per cent, and fish 60 per cent, indigestible and unidentified material contributing the balance. Fish formed the largest item in the diet of the lake fish after they had attained a size of about 12 inches. Up to this size plankton crustacea formed about 25 per cent of the food. From this it is evident that the larger cutthroat trout consume considerable numbers of forage fish where they are available. Stomach examinations of 46 fry of this species showed a great variety of diet, with the larvæ of Chironomous forming the most important item.

OYSTER INVESTIGATIONS

During 1930 investigations relative to various phases of oyster culture were carried out along the Atlantic and the Pacific coasts, the staff of the investigators being more or less evenly distributed in different oyster-producing sections. In New England waters the headquarters for oyster investigation remained, as in previous years, at the Fisheries Laboratory at Woods Hole, where work on physiology of spawning has been continued. Cold Spring Harbor Biological Station, on Long Island, was selected as a suitable place for an experimental study of the control of starfish. The Beaufort (N. C.) laboratory served as the headquarters for South Atlantic investigations, which were greatly expanded during the last year and extended from North Carolina to Florida. On the Pacific coast a study of the life history and cultivation of the west coast oyster, *Ostrea lurida*, was continued. Thanks to the cooperation with the Washington State Department of Fisheries and Game, a small but well-equipped laboratory located in the center of the oyster industry near Olympia was made available for the bureau's investigators. In cooperation with the State authorities of Oregon and California, a survey of local oyster bottoms and experiments on oyster culture were made.

PHYSIOLOGY OF SPAWNING

A study of factors that control spawning is of paramount importance for the successful cultivation of oysters.

The results of the large number of experiments with *O. virginica* carried out by Dr. P. S. Galtsoff from 1927 to 1929 show that no spawning occurs below 20° C., whereas the same specimen can be induced by sperm to spawn as soon as the temperature has been brought above 20°. In a few instances it has been noticed that oysters spawned at 27.5° without being stimulated by sperm. Inasmuch as in those cases unfiltered water was used, the possibility of its contamination with sperm was not excluded. In the experiments with *O. gigas* it has been found that a ripe female can be induced to spawn by a temperature of 30° C. The question naturally arises whether the same results could not be obtained with the other species. During the summer of 1931 experiments were carried out at Woods Hole with ripe *O. virginica* which were kept in aquaria at a temperature of about 20°. To avoid possible contamination the water used in the experiments was filtered through a layer of asbestos about three-quarters of an inch thick. The results of the experiments indicate without any doubt that ripe females can be induced to spawn by placing them in water having a temperature from 24.5° to 30° C. At 31° the females usually close their valves and remain closed until the temperature drops to 30° or 29° C.

The latent periods of spawning reactions—that is, the time elapsed from the moment the oyster was exposed to a given temperature until the beginning of spawning—varies from 20 to 257 minutes and apparently is not correlated with the temperature, the quickness of the response probably depending on the condition of the organism itself.

The fact that the females can be stimulated by a temperature of 24.5° C. or higher suggested the possibility that similar effects might be obtained by a longer exposure to temperatures between 20° and 24.5° C. The results of a large number of experiments, of which only three will be described here, show that this is very doubtful. On July 10, three ripe females were taken from the tank, in which the temperature during the previous week fluctuated between 18.5° and 19.5° C. and placed in an aquarium filled with filtered sea water. The temperature was kept at 22.6° but occasionally rose to 23.4°. The shell movement of each oyster was recorded on the kymograph. The first oyster was kept for 5 hours and 22 minutes, the second for 29 hours and 53 minutes, and the third one for 73 hours and 13 minutes. The water in the aquaria in which the second and third oysters were kept was changed twice a day. None of the oysters spawned during that time, but each of them spawned after sperm were added to the water, the latent periods being 16, 24, and 15 minutes, respectively.

It is interesting to note that in both cases of stimulation, either by the temperature or by the sperm, the reaction is alike and is characterized by a series of rhythmical contractions of the adductor muscle and of the mantle. From that an inference can be made that both factors release some mechanism in the organism of the female which in turn stimulates the muscle and causes the discharge of eggs from the ovary. In this respect the reaction is not specific. It is, however, specific in the sense that sperm of other mollusks (Mya, Mytilus) fail to induce spawning of the oyster. No positive results were obtained also when the sperm of *O. cucullata* was added to the female of *O. virginica* and vice versa.

From a biological point of view stimulation of spawning either by the temperature or by the sperm-and-egg suspension is of great interest. It provides a mechanism which insures successful propagation of the species. Should the temperature of the sea water fail to reach the effective point which would induce shedding of eggs by the females, still the spawning of the latter could be provoked by the sperm discharge of the males, which are more susceptible to the increase in temperature. In most of the cases observed by Doctor Galtsoff, when several oysters were kept together the males spawned first and induced the shedding of eggs by the females. The process, once started, spreads by mutual stimulation of the two sexes throughout the whole oyster bed and results in simultaneous spawning of the oyster population.

SOUTH ATLANTIC OYSTER STUDIES

Investigations and experiments of a practical and scientific nature are being conducted from North Carolina to Florida under the supervision of Dr. H. F. Prytherch, director of the Beaufort (N. C.) laboratory, which serves as the headquarters for this work. In cooperation with the State shellfish commissions and various oyster producers, small experimental oyster farms have been established in each State for the purpose of determining and demonstrating the most efficient methods for oyster culture in each particular region. The production of oysters for both the canning and raw trades are important industries in this region, and the industry is cooperating in this work with a view to improving the size, quality, and quantity of oysters grown for these purposes.

In this section a greater industry and market for raw oysters can be developed not only by increased production of large oysters but especially through improvement in the methods of opening oysters and their preparation for market or shipment. The latter is particularly important in this warm climate and consequently experiments along this line have been undertaken at the Beaufort laboratory, which, as described later, show excellent possibilities for supplying the market with oyster meats in a fresh sanitary condition.

The results of the experiments in oyster farming in the South Atlantic region are described briefly according to the States in which these operations were conducted.

Relation of copper content of water to oyster setting in the South Atlantic.—Previous studies in the North have shown that the copper content and salinity of the water are the chief factors controlling setting and the production of seed oysters. Further investigations show that a similar relationship also exists in North Carolina, South Carolina, and Georgia. Chemical analyses of the water in these localities showed the presence of copper in amounts varying from 0.05 to 0.4 milligram per liter. The heaviest setting was found to occur at the surface of the water during the stage of tide when the copper content was highest. Partition collectors placed at such tidal levels gathered from 1,200 to 3,500 seed oysters per collector.

In southern waters the reproduction and setting of oysters is so abundant as to constitute the greatest handicap to their cultivation. Usually there are two crops of seed each summer, which fasten chiefly upon the adult oysters and so seriously interfere with their feeding and growth as to kill them or produce an inferior oyster. Consequently the studies on setting are being continued in the hope of finding a practical means for controlling or preventing the heavy setting of oysters in certain areas. While copper in minute amounts is beneficial for setting, it also true that slightly higher concentrations of this metal are decidedly toxic to the oyster larvæ. Experiments are in progress to determine the practicability of using copper salts or other toxic substances to prevent the overcrowding and inferior growth of oysters in southern waters as a result of heavy setting.

Improved methods in the preparation of oysters for market or shipment.—The shucking of oysters and their preparation for market are costly operations and of considerable importance in determining whether the consumer will receive this valuable sea food in a first-class physical, chemical, and sanitary condition. Experiments conducted at the Beaufort laboratory by Drs. Vera Koehring and H. F. Prytherch give promise of developing an inexpensive and efficient method of removing oyster meats from the shell more quickly, with less difficulty and labor, and particularly with little or no injury to the oyster tissues. The method may be of further value from a sanitary standpoint, as the medium employed inhibits the growth of spoilage organisms and leaves the meats in better condition for shipment.

In removing the meats by this method the oyster muscle is "put to sleep" or narcotized. Relaxation of the muscle occurs, and the valves of the shell are automatically pulled apart by the pressure of the hinge so that an oyster knife can be easily inserted and the muscle severed from the shell with less injury to the meat than by present methods. The narcotization of oysters is accomplished by the use of a small amount of certain mineral and organic acids in combination, which in experimental procedure costs less than 10 cents per thousand oysters. Oysters may be completely narcotized or caused to gape within a period of six hours, and can be kept without injury in this condition for a considerable length of time. In the experiments conducted thus far the number of completely narcotized oysters in each lot treated has varied from 60 to 90 per cent. In this connection the type and concentration of the chemicals employed are important and further studies are in progress to improve the technique of administering the reagents and test the method on a small commercial scale.

An important feature of this process is that it is not injurious to the oysters, as they fully recover when returned to fresh sea water and may be treated several times in this manner without deleterious effects. The chemicals employed do not cause shrinkage or volume losses of the meat nor impair their food and market value. Narcosis is obtained by using higher concentrations of chemical substances which normally occur in the body and environment of the oyster. Various inorganic and organic reagents are being tested from a practical standpoint to determine their relative efficiency and value for opening oysters. Those in use at present appear to largely disinfect the oyster meats in the process of opening and keep them fresh, firm, and in excellent condition, free from decomposition, for a long period after treatment. The bacteriological phases of the narcotization process will be studied in greater detail later in respect to the purification of oysters both shucked and in the shell. It appears likely that the principles employed in opening oysters by chemical means can likewise be used to improve the keeping qualities of oyster meats in shipment. In the southern climate particularly such improvement is needed and will greatly aid the marketing of oysters and development of the industry.

Oyster investigations in North Carolina.—During the past summer a general survey has been made of the oyster-producing areas in the vicinity of the United States Fisheries Laboratory at Beaufort, N. C., in order to determine the most suitable methods for the development of oyster culture in this region. Experiments and chemical studies dealing with the setting of oysters and the collection of seed have been made in cooperation with Capt. John A. Nelson, State fishery commissioner.

Various types of collectors for gathering seed oysters have been tested on experimental grounds in Core Creek, Newport River, Oyster Creek, and at the United States Fisheries station at Beaufort. In Core Creek a very good crop of seed oysters was obtained on cement-coated tubes and partitions that were planted there on July 23. The partitions were planted just above low-water mark on a natural oyster bed and gathered from approximately 100 to 500 seed oysters per collector. The cement-coated tubes are a new type of spat collector that was developed here during the past summer for gathering set on soft mud bottoms where shells and partitions can not be used. Tubes 2 feet in length and 1½ inches in diameter proved to be the most satisfactory size and collected from 200 to 300 spat each. They were planted vertically in the soft mud bottom surrounding the oyster reefs and were most heavily covered with spat when set out at low-water level.

The heaviest setting of oysters in this region occurs in a narrow 1-foot zone just above low-water mark, and has been found to be due to the higher copper content of the water at this stage of tide. Chemical analysis of the water showed the presence of copper in concentrations of 0.3 to 0.4 milligram per liter and a salinity of 15 to 18 parts per thousand during the tidal period when the setting of oysters was most pronounced. At other stages of tide when setting did not occur the salinity of the water was high (30 to 33 parts per thousand) and the copper content less than 0.05 milligram per liter. Therefore, in planting seed collectors of any kind in this region it is obvious that particular care must be taken to select the zone in which heaviest setting occurs.

A study of oyster distribution along the shores of Core Creek and canal revealed a new kind of brush that can be utilized for gathering seed oysters on the adjacent mud bottoms. The branches and trunk of the myrtle were found to be excellent for this purpose and were densely covered with well-shaped, rapid-growing oysters of different ages. Experiments with this brush will be made here during the coming year.

In Oyster Creek partition collectors were planted on June 17, by Inspector Robert L. Willis, of the State fisheries department. They were elevated a few inches above the bottom on stakes and gathered a light set of approximately 200 seed per partition. Setting in this locality is rarely heavy, which makes it a particularly valuable area for the growing and maturing of large, well-shaped oysters for market.

The partitions and tubes planted on Cross Rock in Newport River likewise collected during the latter part of July a light set similar to that observed on the shells covering this oyster reef. This bed produces a good grade of oyster, but is not as favorable a location for seed collection, as the near-by coon oyster areas.

At the fisheries laboratory the setting of oysters has been more or less continuous from the first week in June up until the first of October. Two plantings of partitions were made and collected a crop of seed oysters ranging from 200 to 1,500 per collector. The heaviest setting was found on partitions planted from low-water mark to 2 feet above and is governed by the lower salinity and higher copper content of the water during this stage of tide. Chemical analysis showed that at such times copper was present in concentrations of 0.15 to 0.20 milligram per liter and served as a pronounced stimulus for the setting of the oyster larvæ.

In summarizing these studies it is evident that partitions, tubes, and brush are commercially practicable as devices for collecting seed oysters in North Carolina waters. When planted on suitable bottoms they can be utilized for gathering an almost unlimited supply of seed of fine quality, which is the first essential requirement in successful oyster culture. The second requirement is the transplantation of the seed to selected growing and maturing bottoms where setting does not occur and interfere with the development of single, well-shaped oysters. Studies of this second phase of the problem are just being started through a series of cruises with the new State boat and United States Fisheries craft to the chief oyster-producing areas in North Carolina. In various localities suitable oyster-growing bottoms will be selected and used as experimental seed-planting grounds.

Oyster investigations in South Carolina.—Preliminary studies have been made at three representative oyster-producing areas in South Carolina for the purpose of determining the most suitable methods for the development of oyster culture in this region. These studies have been made in cooperation with J. M. Witsell, chairman of the South Carolina Board of Fisheries. Various experiments and chemical studies dealing with the setting of oysters and the collection of seed were carried out at Folly Island, Beaufort, and Bluffton. At these stations two definite crops of seed oysters were obtained, the first occurring from the 5th to the 20th of June and the second during the last two weeks in September. By the 20th of October the first crop of seed had attained an average length of 1½ inches, while the fall crop measured on the average only one-fourth of an inch in length. The June set was fairly heavy, especially at the State experiment station at Folly River, where the partition collectors gathered from 2,000 to 5,000 seeds per collector. The September set was much lighter in this locality and ranged from 500 to 1,200 seeds per collector.

At the Folly River station the partition collectors and oak poles planted showed that setting occurs in a zone extending from low-water mark to 3 feet above, but is decidedly heaviest in the 1-foot zone above low-water level. Chemical analyses showed that the copper content of the water increased with the ebbing of the tide and was highest (0.35 part of copper per million) when the tide reached low-water mark. Copper stimulates greatly the attachment of the oyster and was found in this locality to have a direct bearing on the abundance of oysters at different tidal levels.

Similar results were obtained in the experiments carried out at Beaufort, S. C., in cooperation with Capt. John L. Wall, of the Maggioni Oyster Co. and at Bluffton in cooperation with the H. O. Lowden Oyster Co. It was found that the planting of shells or artificial spat collectors on the tidal flats can be more efficiently carried out if particular attention is paid to the time of setting and the selection of tidal levels where seed oysters attach in greatest abundance. Since sedimentation is unusually heavy in this region and may in a short time cover seed collectors with a layer of mud, it is obvious that such devices must be planted just prior to the time of setting to be most effective. Experiments with oak poles and brush show that they are very satisfactory under these conditions for gathering seed oysters if planted vertically, as the surface remains clean and offers the oysters better conditions for feeding and growth than is afforded by old shells. The development of oyster culture by brush and pole methods, similar to those employed in Japan and Australia, appears to be the most practical means for utilizing the extensive mud flats in South Carolina and improving the quality of oysters grown in these waters. Experiments on a small commercial scale will be carried on along this line during the coming year.

Oyster investigations in Georgia.—At Turtle River experiments in oyster farming were conducted in cooperation with T. Q. Fleming, of Brunswick, and the Georgia State Board of Game and Fish. Two phases of modern oyster culture were successfully demonstrated through the collection of seed oysters on brush and shells and the transplantation of year-old seed oysters to hard-clay bottoms, where conditions proved favorable for growth and the prevention of overcrowding by heaving setting. During 1931 the spawning and setting of oysters were heaviest in this locality during the period from the middle of May to the middle of June. A very light set of little importance was also obtained the early part of October. Oak poles and brush were planted on the tidal flats and gathered a good crop of seed oysters, thus demonstrating the value of such operations for utilizing the extensive barren mud bottoms in this region. Several hundred bushels of year-old seed from the overcrowded coon oyster reefs were transplanted to deep-water, hard-bottom areas and have shown rapid growth and considerable improvement in shape of the shell over those left on the natural beds. Studies of the temperature, salinity, hydrogen-ion concentration and copper content of the water and their relation to the setting and distribution of oysters in the Turtle River region were made. An examination of many of the natural oyster beds in Georgia showed considerable evidence of depletion from overfishing and the necessity of rehabilitating these beds and adjacent areas by increased planting of shells and brush seed collectors.

CONTROL OF STARFISH

Starfish investigations carried on by Louise Palmer were conducted with the view of finding an efficient method of combating this dangerous enemy of the oyster.

The common starfish, *Asterias forbesii*, is found along the Atlantic coast from Maine to the Gulf of Mexico, and is the only species common from Cape Cod to New York, an area which is the center of the largest cultivated oyster grounds in the United States.

The problem of starfish control from a practical standpoint resolves itself into the following points:

(1) The present mechanical method of controlling starfish is quite inadequate in decreasing the population to any noticeable degree and is very expensive.

(2) Overhandling and manipulation of oysters results in stunting the growth or even killing individuals.

(3) Great, or perhaps the greatest, damage is done by young, almost microscopic starfish on the spat, for which loss no method of control has been practiced.

Although starfish mops have been used for more than 50 years, there seems to be no diminution in the number of starfish, and they are as serious pests to-day as they were when control was first advocated. A most wasteful result of mechanical control is the injury to the oyster. Aside from the fact that starfish are continuously eating oysters, the mops chains and dredges are continuously breaking off the new shell growth faster than it can be deposited. Such a practice continued over a period of time results in a stunted oyster which requires another year of growth before marketing.

Another phase of the problem is the actual number of shellfish consumed by the starfish. Young starfish 2 or 3 days old can open and digest a 3 or 4 day old spat in a little over 20 minutes. In 11 hours after an adult starfish crawled into a two-year-old oyster it left the shell empty and absolutely clean. On July 21, 1931, 35 starfish, with an arm length between 4 and 7 centimeters were placed in a wooden float in Cold Spring Harbor, and clusters of year-old oysters provided as food. Twelve days later 46 oysters had been eaten and after 30 days 79 were eaten and the average increase in starfish arm length was 0.7 centimeter. Under population conditions as they exist in some seriously infested areas, starfish could completely wipe out an oyster crop if left undisturbed. Because of the inadequacy of the present mechanical methods of combating starfish, attempts were made to control them by chemical means.

The chemistry of sea water is, however, so complicated, its living organisms so varied and important to man, that it is indeed presumptious to propose the using of a poisonous chemical in the water as a means of control. Studies have been made on cases of unusual mortality of organisms or of their destruction due to pollution by industrial wastes, but little or no attempt has been made to artificially change the sea water in order to limit certain forms.

Such a procedure meets with seemingly and perhaps actually insurmountable difficulties. In the first place, any substance which can kill one form is poisonous in a greater or less degree to nearly all other living organisms. Their only hope of escape would be a more effective protective mechanism. Starfish, having an exposed respiratory and circulatory system and a relatively slow locomotion, are less able to protect themselves than oysters, crustacea, or fast-swimming fish.

Many chemicals were tried, but copper sulphate seemed to be the only substance effective in small amounts and at the same time worthy of practical consideration. During the summer of 1931, at the laboratories of the Long Island Biological Association, experiments were performed to determine the effect of that salt on starfish, oysters, and other marine forms.

Experiments with adult starfish show that the time necessary to kill the organisms varies in relation to concentration from 2½ hours (10 parts of $CuSO_4$ per million) to 3 minutes (1,000 parts $CuSO_4$ per million). Starfishes of various age show remarkable difference in susceptibility, the small individuals being affected in a shorter time than the larger ones. For instance, starfish of less than 1 centimeter will be killed by the concentration of 10 parts per million in 5 minutes, but those more than 5 centimeters long remain alive after nearly 2 hours' exposure.

In order to determine the effect of the various environmental factors on the toxicity of copper sulphate, temperature, salinity, and hydrogen-ion concentration were controlled or varied with interesting results. A series of experiments where starfish 3 to 7 centimeters in size were exposed to 500 parts per million of $CuSO_4$, at temperatures ranging from 10° to 35° C., show that exposure necessary to kill decreases from 8 minutes at 10° C. to 1½ minutes at 35° C.

A number of experiments were run testing the effect of pH within the normal range, 7.5 to 8.4. There was a slight tendency for the water with originally lower pH to be more toxic in a given concentration. Individual susceptibility is so varied and the differences so small that the results were quite inconclusive. However, as soon as the pH were artificially lowered below 7 the toxicity became much more pronounced. Whether deaths were due to the copper ion alone could not be determined, for the animals die upon prolonged exposure to water high in hydrogen ions. Copper sulphate lowers the pH of sea water due to its carrying out in the precipitate carbonate and hydroxyl ions. When copper salts are added to acidified sea water no precipitation occurs, and although the toxicity is greatly increased we are dealing with an entirely different phenomena.

The above factors are of considerable importance when practical application of the salt is considered. There is variation in salinity and hydrogen-ion concentration during each tidal cycle. Temperature varies with the seasons, depth of water, river discharge, and solar radiation. A correlation of these factors, together with a lethal concentration of the copper salt and a knowledge of the habits of the starfish, may produce a workable method for control.

Experiments using copper sulphate on the oyster beds.—Several methods were attempted in order to see whether it would be practicable to use copper sulphate as a killing agent for starfish on the beds. The first question was concerned with the method of application. The following experiments were tried, and the results are listed under each discussion.

Experiment No. 1 was conducted on the Bluepoints Oyster Co. grounds at Centerport, Long Island, August 4 and 5, 1931. One acre, 6 to 10 feet deep, 300 feet from low-tide line, was chosen for the experiment. A small hand dredge dragged for one minute caught in three hauls an average of 13 starfish 6 to 8 centimeters in size. A concentrated solution of copper sulphate in acidified sea water was prepared by adding 80 pounds of copper sulphate to a barrel holding 7 cubic feet of water. Using a hose, this solution was slowly pumped over the bottom for 20 minutes at slack low tide. The entire acre was covered by circles of the boat. The initial copper content of the water was 0.05 part per million and the pH 7.8. Immediately after the treatment there was 0.6 part per million of copper and a pH of 7.2 at the bottom. The next day there were virtually no starfish on that area, in eight dredges there were three live starfish and no dead ones. Oysters, scallops, and crustacea showed no ill effects. The water, pH, and copper content of the water were normal. Some of the tops of the sea weed and grass were killed, but the roots were unaffected and the grass survived.

Experiment No. 2 was conducted on the Andrew Radel Oyster Co. grounds at Oyster Bay, L. I., August 16 and 17, 1931. The area chosen was offshore and averaged 16 feet deep. The starfish were small, ranging in size from 3 to 6 centimeters, and were very numerous. The same type of experiment as before was tried, except that a 12-foot 1¼-inch brass pipe was used to form horizontal bar of the **T** and the **T** connected by a large hose to the bilge pump of the steam boat. One hundred fifteen gallons of solution containing 100 pounds of copper sulphate and 75 pounds of nitre cake were placed in vats on the deck. The nitre cake is a crude sodium acid sulphate containing a high percentage of sulphuric acid and serves to make the solution more acid, and consequently retards the reaction of the copper with the sea water.

The solution was pumped out at slack low tide on August 17, along a straight line of 500 feet. Twelve minutes pumping emptied the vat. The original pH was 7.8 and the copper content 0.1 part per million. Immediately following the treatment the pH value had dropped to 7.2, but the copper content showed only 0.7 part per million. Next day there were practically no ill effects noticed on the starfish. In three dredges bringing up 33 starfish after a minute's hauling there were only 4 dead ones. The pH and copper content had returned to normal. Better results were obtained in the experiments on grounds of the Beacon Oyster Co., at Wickford, R. I.

A summary of the results of numerous experiments brings out the following points:

(1) Copper sulphate in no case killed more than 10 per cent of the starfish.

(2) Application as a solution is to elaborate in manipulation and no more effective than crystals.

(3) The most effective application consists in scattering crystals of copper sulphate at slack low water, preferably at neap tide.

(4) Starfish reaction to the presence of copper sulphate is one of avoiding the treated area.

(5) The use of paper bags filled with crystals presents a more accurate and economical method of application.

(6) Only in one case were there indications of death of the oysters. Periodic treatment did not seem to affect the food supply to such an extent that the oysters were harmed.

Because of the difficulties encountered in killing adult starfishes by copper-sulphate treatment, it is expected that the solution of the problem can be found in the control of propagation of starfishes rather than in destroying the adults.

PACIFIC COAST OYSTER STUDIES

At the Hopkins Marine Station, Pacific Grove, Calif., experiments were made by Dr. A. E. Hopkins during three months on the sensitivity of the oyster to salts, most of which normally occur in sea water. The chemical sense of the oyster is highly developed, as shown by the following threshold concentrations: Potassium sulphate, M/640; potassium ferricyanide, M/25,000; potassium nitrate, M/40,000. The potassium salts activate the oyster more effectively than the salts of any of the other normally occurring cations.

Studies of oyster culture in Puget Sound.—An intensive investigation was begun during 1931 in cooperation with the State of Washington on the problems of the Olympia oyster industry. The Washington State Department of Fisheries and Game constructed an adequate field laboratory at Olympia, purchased a boat, and provided a boatman as well as some of the operating expenses. The investigation is being directed by Doctor Hopkins of the bureau, and it is planned to continue the work for several years.

The primary purpose of this investigation is to develop effective methods of collecting seed oysters in order to rehabilitate and expand the industry. Experiments made during the summer gave highly satisfactory results. The daily abundance of spat obtained in the two most important oyster-producing bays was determined throughout the season and at the same time records of temperature, salinity, pH, and plankton were kept. In Oyster Bay setting took place in two distinct periods, centering, respectively, in June and August. In Mud Bay only one important setting period occurred during June and July. A comparative study is being made of hydrographical conditions in these two apparently almost identical neighboring bays in order to throw light on the causes of these differences and on the factors favorable to setting of oyster larvæ.

The hermaphroditic Olympia oyster carries its larvæ for some time in the mantle chamber. Counts of larvæ showed that an individual may bear up to 350,000 at once, the number depending roughly on the size of the parent. Spawning began early in May and some gravid specimens were found as late as the middle of November, though spawning was most general and profuse in May and early June.

Wire baskets of shells suspended from floats in the deep channels well removed from the main oyster beds obtained a set considerably greater than that on the best seed grounds. Few spat were caught in the surface few inches of water; the maximum number were taken at a depth of 10 to 20 inches, below which the abundance gradually diminished to a depth of 8½ feet, the greatest depth tested.

A modification of the egg-crate filler has been developed as a spat collector for use in the dikes in which Olympia oysters are produced. The new type presents a large amount of horizontal surface, absent in the case of the standard filler, and permits circulation of water through the cells. Most spat were caught on the under horizontal surfaces, few on the upper. Because of the free circulation of the water, the vertical surfaces caught more spat than similar surfaces on the standard filler. Although the new type consists of one-fourth less paper, it caught three times as many spat as the standard.

Investigations in Oregon and California.—During the past year experiments have been conducted by H. C. McMillin in Oregon and California on native, eastern, and Japanese oysters. There is a widespread interest in oyster culture in these States, but a large majority of the persons now engaged in the industry have had no practical experience. For methods of culture and harvesting they rely almost solely on printed matter, written or verbal suggestions, and demonstrations with seed, or young oysters, on various portions of their lands. Because of this some time has been spent on projects intended to illustrate the rudiments of oyster culture to the growers.

A survey of oyster bottoms in Yaquina Bay revealed that this area contains about 200 acres of natural beds, all of which occur below the low-tide level. The salinity of the bay is affected by local rainfall and is very low in winter and spring.

Observations on imported Japanese seed oysters planted in Elkhorn Slough, Calif., show that this species grows very rapidly. Seed oysters were received from Japan and planted on March 6; they were ready for the market in eight months.

ALASKA RAZOR-CLAM INVESTIGATION

Observations on the razor-clam beds in the Prince William Sound, Copper River, and Bering River areas were made during the season of 1931, under the direction of Seton H. Thompson, by the temporary employees detailed to enforce the regulations in regard to the clam fishery.

Sampling to determine the age composition of the commercial catch was continued. The clams taken were from 5 to 12 years old. It has been pointed out in a previous report that 36.5 per cent of the clams mature in their fourth year, 80 per cent in their fifth year, and all are mature at 6 years of age. Approximately 50 per cent of all clams taken in the commercial fishery in 1931 were older than 6 years, and 80 per cent were mature. More than 55 per cent had spawned more than once.

Other observations included a determination of the time and duration of spawning, and the abundance of clams 1, 2, and 3 years old on the bars. The large number of young clams observed on the bars reflects the present healthy condition of the beds.

The razor-clam fishery in this locality in 1931 was more intensive than in any year since 1927, and the pack was considerably larger than any since 1925. The larger pack was partly due to an extension of 15 days to the fishing season, and partly due to the exploitation of new bars as well as to the increase in the number of clam diggers.

It now appears that with the beds in their present satisfactory condition, the regulations which limit the size of razor clams that can be taken for commercial purposes and provide a closed season of six weeks will afford adequate protection for this fishery.

MUSSEL INVESTIGATIONS AND POLLUTION STUDIES

Investigations of the fresh-water mussel fauna of the interior waters have been continued by Dr. M. M. Ellis, professor of physiology at the University of Missouri, assisted by several investigators. These, together with several professors of the university who collaborate and advise and graduate students who work independently on related problems, constitute the " Columbia (Mo.) unit " of the division in interior waters. Commodious and well equipped laboratory quarters are furnished to the bureau's staff free of charge by the University of Missouri in a new wing of the medical building, acknowledgment of which is hereby gratefully made.

During the spring of 1931 field parties visited the Lake Keokuk district several times to continue observations made during the 1930 survey. Other parties studied streams in northeastern Arkansas, eastern Kansas, and north central Texas. After reoutfitting the U. S. Quarterboat *348* as a floating laboratory at Keokuk, Iowa, a field party of 11 went aboard in June and continued the survey work begun in 1930. Through the cooperation of the United States Engineer Corps this party covered the Mississippi River from Lake Keokuk south to Cairo, Ill.; the Ohio River from Cairo, Ill., to the mouth of Green River above Evansville, Ind.; and the Tennessee River from its mouth at Paducah, Ky., to the Hiwassee River, some 40 miles above Chattanooga, Tenn. During this survey many tributary streams were examined and an extensive study made of the Lake Wilson (Ala.) region. The boat returned to Keokuk, Iowa, the last of September and the collections were sent to the laboratory at Columbia, Mo., for analyses and review.

After the quarterboat was tied up for the winter, parties working by auto continued field work in the Lake Keokuk region and north on the Mississippi River to Winona, Minn.; also in northern Arkansas and in the Lake Worth region near Fort Worth, Tex. During the last of December field parties working south through Missouri, Arkansas, Tennessee, Mississippi, Louisiana, and Alabama studied the St. Francis, the White, the Black, the Pearl, the Tombigbee, the Warrior, and the Tennessee Rivers and their tributaries.

POLLUTION STUDIES

In view of the fact that the 1930 survey on the Mississippi River demonstrates that erosion silt is a factor of major importance in many fisheries problems in the inland river systems, particularly problems in which pollution is involved, the pollution studies made by this unit have centered around erosion silt during the past year. In both the field work and the laboratory studies effort has been made to secure qualitative and quantitative data on the effect of erosion silt alone and as a carrier of other substances. The results of the investigations to date may be summarized as follows:

Mass of silt.—The amount of silt already deposited on the bottom of the streams studied exceeded even that which the 1930 survey suggested would be found. In certain places the silt deposit exceeded 10 feet, and in one locality on the Tennessee River, 27 feet in thickness. Behind both temporary and permanent obstructions to stream flow the deposition of erosion silt was proceeding rapidly in all of the streams studied, soundings regularly showing deposits from 1 to 4 feet in depth.

Mechanical action of silt.—The field work demonstrated that wherever the current of the water is slowed sufficiently not only is the bottom covered with silt deposits but a colloidal suspension of silt particles was to be found just above the top of the semisolid silt, so that in many places there was a progressive gradation from the muddy river water through a thick colloidal suspension to the semisolid mass of deposited silt. Laboratory tests showed that the top layers of the deposited silt and the bottom layers of the suspension supported very little weight, so that even small animals mired down readily in the silt deposit. From the field work it was noted that 6 inches of erosion silt, or frequently less, was sufficient to completely change the bottom fauna and to eliminate most of the sedimentary animals usually found at the bottom of unpolluted streams.

Erosion silt in suspension.—A special apparatus making use of photoelectric cells was devised for the measurement of the amount of material in suspension in the various waters studied. By means of this instrument readings could be made both rapidly and very accurately, so that a large amount of data of this sort was assembled during the past year. These studies show that the erosion silt in suspension materially effects the light transmission into the river water, thus materially changing the river as a habitat for certain microorganisms and other animals even before the silt has settled to the bottom. The elimination of light by the silt suspension amounts to over 90 per cent in the first 25 millimeters of water, and silt suspension was found to be selective against certain parts of the spectrum. The greatest penetration through the silt suspension was made by the orange-red rays, although only a small amount of this light was transmitted. The alteration of light penetration by the suspended silt in river water, particularly in the larger bodies of water which are impounded behind the power dams on the Mississippi, produced changes in the plankton, thus altering the basic unit in the food chain of the aquatic fauna. Sudden and abrupt changes in the plankton count followed sudden rises in the amount of suspended matter present in these waters.

The erosion silt in the water also produces definite changes in the heat conduction and heat radiation of the water; and since the dissolved oxygen varies in inverse direction with the temperature, these changes in the heating and cooling of the water attendant on the presence of erosion silt have important bearing on the respiration of the river and therefore on the available oxygen for the animals living therein.

Erosion silt and oxygen demand.—Because of the colloidal nature of erosion silt, it carries down with it particles of organic material in various stages of decomposition. Decomposing carcasses of animals and masses of rotting vegetation are also readily covered by the silt deposits and are thus cut off from free access with the water of the stream. Under these conditions the rate and character of the decomposition of the organic material carried down by the silt or buried under it is altered and enormous quantities of gas produced in some places. This condition creates a high oxygen demand in the top layers of the deposited silt, resulting in complete change of the bottom fauna, reducing it to those few forms capable of withstanding conditions of low oxygen and water polluted by products of decomposition. This oxygen demand is not only evident in the quieter portions of the rivers but also shows in the main streams themselves. At the junction of the Ohio and Mississippi Rivers below Birds Point, for example, the oxygen demand of the Mississippi River water loaded with polluted silt from the St. Louis district was sufficient to reduce the entire volume of Ohio River water, which had a much higher oxygen content than the Mississippi, to the Mississippi River level in less than 12 miles.

Erosion silt and bacteria.—Comparative bacteriological studies on the erosion silt and organic deposits at the bottom of the river as compared with bacterial counts in the main stream itself show definite differences in the character of the bacterial flora in the silt layers, and in many places an excessively high bacterial count, due to the combination of erosion silt and organic waste which the erosion silt carries along from the sewerage and wastes introduced into the river by cities and manufacturing plants. Laboratory tests carried forward under controlled conditions show the decomposition of various organic substances mixed with erosion silt to proceed at a slower rate and to produce different end products with greater oxygen demands than the decomposition of these same substances in plain water alone.

Comparison of silts.—Chemical studies and electrical and physical measurements on erosion silts from various parts of the Mississippi Valley have been made and technical classifications of these silts obtained, which permit comparisons of the erosion silt action through the Mississippi River system.

Erosion silt and industrial pollution.—Detailed laboratory studies on the relation of erosion silt to industrial pollution, particularly sulphur, acid wastes, and heavy metal wastes, are in progress, continuing the work on sulphur, acid pollution, and arsenic begun last year. These studies so far indicate that the erosion of silt is both a carrier and reservoir for many of these substances, and the presence of erosion silt in many cases augments the detrimental action of these substances on living organisms.

MUSSEL INVESTIGATIONS

The overwhelming of so many mussel beds by the silt deposits is so evident in the Mississippi and Tennessee systems that in view of the proposed modification of many of the inland streams for navigation and hydroelectric plants careful attention has been given to the condition of the existing mussel beds wherever found throughout the field work, and extensive collections of all species, both commercial and noncommercial, were made for survival and population studies. Upward of 10,000 shells have been examined in the last year and detailed statistical studies made of the age, rate of growth, weight, thickness, and of the physiological condition of the animal itself at the time of capture for comparison with the physical and chemical data obtained in the field at the habitat from which the individual mussel was taken. In this way it has been found that the natural replacement at present of fresh-water mussels of the commercial species in the Upper Mississippi River is far below that required for even the maintenance of the existing beds. The statement is also true to a large extent for the portions of the Ohio and Tennessee systems studied. These facts have been set forth in the preliminary report (Fisheries Circular No. 7, 1931). With the depletion of the mussel beds of these major streams almost a certainty if existing conditions continue, detailed physical, chemical, and biological studies have been made in the most favorable habitats found with a view to a duplication of such conditions in controlled waters. From the data obtained experimental raceways have been planned and experiments will be started this spring in the Lake Worth area with a view to duplicating the best conditions for mussel growth and the rearing of large numbers of mussels in small areas.

The transfer of attention from the reestablishment of the mussel beds in the natural habitats in the larger rivers, as the Mississippi and Tennessee, to the production of artificial beds in controlled habitats has made necessary extensive studies on the physiology of the fresh-water mussel, particularly feeding and general reactions, because of the paucity of literature on these subjects bearing on the particular problems in hand. Consequently, mussels from various parts of the United States have been placed under observation in the laboratories of the unit at Columbia, Mo., and detailed physiological observations made on the movements, respiration, heart action, feeding, hibernation, and growth of these animals. From these studies the oxygen requirements, food choices, food elaboration, and winter habits of these animals have been followed preparatory to placing them under observation in the controlled habitats out of doors. Work reported last year has been confirmed, namely, that contrary to the popular belief most of the mussels prefer clean water and are very sensitive to changes in their environment, particularly such changes as are produced by erosion, silt, sewage pollution, and industrial wastes. It has been found that the animals can be fed readily with several inexpensive substances and the general condition of the mussel improved, as shown by physiological observations on the activity of the animal itself and by the amount of food stored in the living animal. All of these laboratory observations are to be used as scientific backgrounds for the field work at the propagation station.

Observations on glochidia and spawning time of several species of fresh-water mussels have been extended during the past year. The peculiar spawning habits of the Arkansas fanshell have been worked out in considerable detail and constitute a unique type in the known methods of spawning of fresh-water mussels. Gravid yellow sandshells have been carried throughout the winter and observations on the needs of gravid individuals made to extend the knowledge of handling of these animals for breeding stock.

A census of the parasites, diseases, and injuries of the fresh-water mussels have been carried on through the year, as all parasites found have been preserved and the physiological and pathological conditions of each mussel studied noted. As is well known, a water mite is perhaps the commonest parasite of fresh-water mussels in the United States, and the depredations of this parasite have been followed in the field work throughout the year.

Limnological observations.—Various species of animals have been used as indicators of river conditions, and consequently collections of plankton, shore animals, and bottom forms have been made wherever possible throughout the course of the field work. These collections are discussed in the forthcoming report on the 1931 survey.

ACTIVITIES OF THE FISHERIES BIOLOGICAL LABORATORIES

WOODS HOLE, MASS.

The bureau's laboratory at Woods Hole, under the direction of O. E. Sette, has furthered the scientific investigations of the bureau in supplying facilities for experimental work on oyster problems, fish tagging, rate of development of mackerel eggs, and rearing of larval fish. The station also served as a base for the collection of data on the local mackerel fishery; for studies on planktonic fish eggs and larvæ; and for the tagging of scup. With the collaboration of the fish-cultural staff, some 4,000 flounders caught incidental to hatchery operations were tagged at the station; also more than 300 brood cod.

Due to the limited funds available for station maintenance, the buildings and equipment have not kept pace with the requirements of the bureau's program. Particularly urgent is the replacement of the collecting vessel and the station launches with more seaworthy craft capable of operating appropriate fishing gear. The station's usefulness would also be greatly increased by weatherproofing the buildings, to permit occupancy for experimental work during the winter and early spring periods, which is the only time that early life-history material on certain important food fishes is available.

In accordance with the bureau's long-established policy of encouraging independent research in marine biology and related subjects, the facilities of the laboratories at Woods Hole, Mass., were made available to a number of investigators from various educational institutions. Personnel so accommodated at Woods Hole included: Dr. Robert P. Bigelow, Massachusetts Institute of Technology, stomatopoda of the *Albatross* Philippine expedition; Frank A. Brown, Harvard University, mechanism of color changes in the shrimp; Dr. N. A. Cobb and assistants, Department of Agriculture, nematodes; Paul S. Conger, United States National Museum, diatoms of the Woods Hole region; Kendall W. Foster, Harvard University, color changes of Fundulus; Dr. F. G. Hall, Duke University, respiration of fishes; Charles W. Hooker, Duke University, respiration of fishes; Mrs. Helen W. Imlah, Radcliffe College, effect of thyroxin on the ascidian larvæ; Dr. George B. Jenkins, George Washington University, vertebrate embryology; Dr. Edwin Linton, University of Pennsylvania, helminth parasites of fishes; W. G. Lynn, Johns Hopkins University, embryology of the nervous system of reptiles; Dr. J. H. Sandground, Harvard University, helminth parasites of fishes; G. W. Taylor, Princeton University, respiration of luminous bacteria and permeability in starfish eggs; Sam R. Tipton, Duke University, respiration of fishes; Dr. C. B. Wilson, State Normal School, Westfield, Mass., copepods of the Carnegie expedition.

BEAUFORT, N. C.

Research.—The Beaufort laboratory under the direction of Dr. S. F. Hildebrand until July 1, 1931, and under Dr. Herbert F. Prytherch after that date, is being developed as a research center in the South Atlantic region for marine studies in both pure and applied biology. The chief investigations conducted here at present by the bureau's staff, as reported elsewhere, deal with the biology and cultivation of the oyster, the copper content of inshore coastal waters, the development and distribution of the shrimp, and the propagation of the diamond-back terrapin. Laboratory facilities have been furnished to independent research workers from other institutions who have engaged in the following studies: Dr. H. V. Wilson and Joseph H. Pratt, jr., of the University of North Carolina, cellular behavior in the embryonic development of hydroids (Pennaria), the early development of sea urchins (Toxopneustes), and the regeneration of young ascidians (Styela); Dr. Bernard

Steinberg, director of the Toledo Hospital, the effect of bacterial toxins on various marine forms; Dr. Ezda Deviney, of the University of North Carolina, regeneration of Ascidians, particularly with respect to the specific cells in Perophora that are of greatest importance in this process; Dr. C. D. Beers, of the University of North Carolina, structure and life history of two colonial protozoa (Vorticellidae); Rebecca Ward, of Judson College, invertebrate marine fauna of this region and early development of several Echinoderms; Dr. Bert Cunningham, of Duke University, relationship of temperature to the rate of embryonic development of diamond-back terrapin.

The facilities of this station were also utilized by the investigators of the United States Chemical Warfare Service, who tested the value of various oils as a preventive of the destruction of wood by marine borers. In cooperation with the Eastman Kodak Co. an educational motion-picture film was prepared showing photomicrographic studies of the development of the oyster and the scientific methods of oyster cultivation that have been developed by the Bureau of Fisheries.

Terrapin culture.—The propagation and distribution of the diamond-back terrapin is meeting with greater success each year. In the spring of 1931 about 5,500 year-old terrapins from the 1930 brood were turned over to the North Carolina Department of Conservation and Development for liberation in the coastal waters of this region. The 1931 hatch, amounting to 12,152 young, has exceeded all former records and is over 25 per cent greater than the largest previous hatch of 8,931 in 1928.

Growth studies and feeding experiments with the 1930 brood were made during the first half of the year by Dr. Samuel F. Hildebrand. Several of these experiments extended over three seasons and yielded noteworthy results that are of value in the culture of this species. Of the various foods and mixtures of foods used, oysters fed alone produced the most rapid growth in the 1930 brood, with a mixture of oysters and fish a close second. Fresh fish fed alone promoted a fair rate of growth and is the cheapest and most easily prepared terrapin food available at Beaufort. It was shown again that salt water is a slightly better medium than fresh water for young terrapins in the brooder house.

Various diseases develop during the period that the young are cared for in the rearing house and greatly reduce the total production of year-old individuals. The disease, designated as "sores," for want of a better term, which has been present among young winter-fed terrapins from year to year was rather more prevalent than usual in the 1930 brood and in a few tanks reached epidemic proportions. Among 7,054 animals taken care of in the brooder house, 6 per cent died of this disease. "Soft shell," associated with a failure to feed and to grow, caused 14.2 per cent of deaths, and all other causes 1.6 per cent, making a total death rate of 21.8 per cent. This is near the average death rate for winter-fed animals from 1920 to 1929, inclusive.

In rearing the large 1931 brood particular attention has been given to these diseases and studies made to determine their cause and effective method of control. Shortly after the young were transferred to the rearing house there appeared a serious outbreak of the tail-and-foot disease, which in the past has destroyed from 17 to 35 per cent of the total brood. Experiments carried out by Dr. H. F. Prytherch for the purpose of finding a practical cure for this malady show that copper is very effective not only in checking the disease but also in permitting regeneration of the infected tissues. In the early fall the disease soon assumed epidemic proportion and appeared in the form of rapid growing lesions of the tail, feet, skin, and eyes of the young terrapins. Various methods of disinfection were tried. The rearing troughs were regularly disinfected with various concentrations of formalin, and a strong solution of salt brine, while the infected terrapins were isolated and treated with dilute solutions of copper sulphate, aluminum sulphate, formalin, and sodium thiosulphate.

In the two control lots there was a loss of over 94 per cent of the terrapins after a period of 10 weeks. On the other hand, those treated with copper sulphate showed in the same length of time a total loss of only 8 per cent. In the aluminum sulphate, formalin, and sodium thiosulphate solutions there were losses of 20 per cent, 15 per cent, and 22 per cent, respectively. Though each of these four solutions checked the rapid growth of the disease, its complete elimination was evident only in the lot of terrapins treated with copper sulphate. A careful examination on November 10 of the terrapins treated with copper showed that every single individual had completely recovered from lesions affecting the eyes, tail, and feet and had grown a new layer of skin over the injured tissues.

Diseased terrapins from the numerous rearing compartments were also placed in a large copper-lined tank in the hope that this might prove a practical method of combating the disease. The animals placed here exhibited remarkable improvement in a few days and showed after a period of three months a loss of only 13 out of a total of 146 infected individuals. Since metallic copper apparently gave off enough free ions to produce a beneficial effect, a small piece of sheet copper 2 inches square was placed in each rearing compartment. Noteworthy results have followed this simple procedure, as evidenced by the fact that the loss of young terrapins has steadily decreased, from 103 in September to 27 in October, 21 in November, and only 8 in December. The records of terrapin mortality for 1930 are much higher than for the present year and show a loss of 41 out of a total of 7,028 in November and 26 out of a total of 6,987 in December, while for the past two months there has been a loss of only 21 out of 12,022 in November and 9 out of 12,001 for December. It is probable that the rapid recovery of the terrapins in the presence of copper is due not only to the bactericidal action of this element but also to a possible deficiency of copper in the diet for blood formation as a result of keeping the animals in confinement.

A report covering all terrapin-cultural activities carried on since the preparation of the last general report in 1927 (Review of Experiments on Artificial Culture of Diamond-Back Terrapin, by Samuel F. Hildebrand, Bulletin, U. S. Bureau of Fisheries, Vol. XLV, 1929 (1930), pp. 25 to 70), was prepared during the year.

Shore fishes of North Carolina.—The studies of the development of fish eggs and young fish, undertaken several years ago, was continued actively by Dr. Samuel F. Hildebrand and Louella E. Cable at the Beaufort Laboratory. Field work was continued, and the collections for study were considerably augmented. In the laboratory the study and identification of specimens was continued, and a special effort was made to build up for different species complete series showing all the stages in the development from the egg, or very small larvæ, to the adult. Descriptions and drawings for several species, together with notes on their spawning habits, rate of growth, food and feeding habits, and commercial importance, were prepared.

APPROPRIATIONS

Under the terms of the act of May 21, 1930, known as the Five-year construction and maintenance program for the Bureau of Fisheries, additional appropriations of funds for the division of scientific inquiry have been made. During the fiscal year ending June 30, 1931, $262,000 in round numbers was provided for the scientific work of the division. For the remaining half of the year, appropriations for the fiscal year 1932, totaling approximately $322,500, were available. These figures represent the combined appropriations from various accounts except funds spent for vessel operations in connection with scientific work. The funds were allotted in the various sections of the country as follows: For fishery investigations in the Atlantic and Gulf coast areas, 23 per cent; for the Great Lakes and interior lakes, 8 per cent; for the Pacific coast, 17 per cent; for investigations in the interest of fish culture throughout the country, 15 per cent; for shellfish investigations, including oyster cultural studies, mussel propagation, and pollution studies, the shrimp investigations, and the operation of the Beaufort (N. C.) Fisheries Biological Laboratory, devoted chiefly to oyster-cultural studies during the last half of the year, 23 per cent; for studies on the conservation of fish by means of screens and ladders, 6 per cent; for the operation of the central laboratory in Washington, administrative costs, and supplies furnished to field investigations through the Washington office, 7 per cent.

As was pointed out in the previous report of this division, the greatest obstacle to the orderly development of a comprehensive program of fisheries research, adequately covering all sections of the country, lies in the failure to provide for increased vessel operations. Although small craft have been added to the bureau's fleet for inshore-fishery studies, in some localities, in the North Atlantic particularly, investigations are being hampered by lack of adequate vessel facilities. Nevertheless, it is anticipated that, pending the securing of a seagoing vessel suitable for high-seas investigations, some improvement in existing facilities can be made during the fiscal year from funds already appropriated which will in a measure compensate for these deficiencies.

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PROPAGATION AND DISTRIBUTION OF FOOD FISHES, FISCAL YEAR 1932[1]

By Glen C. Leach, *Chief Division of Fish Culture*

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INTRODUCTION

The artificial propagation of fish in hatcheries and their distribution in public waters by the Federal Government and the States is one phase of the important problem of conservation of aquatic resources. In distributing commercial species of fish governmental hatcheries are helping to provide the raw material for an important food-producing industry, the commercial fisheries. In propagating and planting game fishes the agencies so concerned are acting with a view to conserving recreational facilities, an activity comparable to the maintenance of national and State parks.

In addition to this phase of the conservation of game fish, there are indirect economic factors involved, since the sport of angling has a

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[1] Approved for publication, Nov. 11, 1932.

considerable financial bearing, arising from the large expenditures by the public in the pursuit of game fish. This phase was clearly brought out in the report of the Senate Committee on Conservation of Wild Life Resources to the Seventy-first Congress. It is comparatively easy to demonstrate by facts and figures the beneficial results attending the stocking of game fish in any given area, or even of commercial fishes in the minor interior waters. The hatching and distribution of such migrants as the Pacific salmons and other marine varieties does not lend itself so readily to a statistical analysis of the direct benefits. However, in many instances, as in the case of shad, cod, haddock, pollock, and anadromous forms, hatchery activities are in the nature of a by-product recovery, since the eggs not taken and incubated by artificial means would be utterly lost in the marketing of the fish. The commercial forms can be handled in large numbers at a very small unit cost, and justification for the greater part of the hatchery work devoted to the maintenance of the commercial industry lies in the foregoing general facts.

Part 1.—FISH PRODUCTION: PROPAGATION AND RESCUE WORK

SPECIES HANDLED

Practically all parts of the United States and certain areas in the Territory of Alaska are covered by the activities of the bureau's hatcheries. Practically every fresh-water form of any importance from a commercial or game standpoint is included among the 49 species which were propagated or handled by rescue crews during the fiscal year 1932. A few selected groups of marine fishes are propagated, but a considerable number of the important species in this category are not readily susceptible to propagation methods or are not in need of such conservation measures at this time and, therefore, are not handled by the hatcheries. There follows a list of the species propagated for the fiscal year 1932.

- Catfishes (Siluridæ):
    - Catfish (*Leptops olivaris*).
    - Spotted catfish (*Ictalurus punctatus*).
    - Horned pout (*Ameiurus nebulosus*).
- Suckers (Catostomidæ): Buffalofish (*Ictiobus sp.*) and suckers (*Catostomus commersonii*).
- Carp (Cyprinidæ): Common carp (*Cyprinus carpio*).
- Shad and Herring (Clupeidæ):
    - Shad (*Alosa sapidissima*).
    - Glut herring (*Pomolobus æstivalis*).
- Salmons, Trouts, and Whitefishes (Salmonidæ):
    - Common whitefish (*Coregonus clupeaformis*).
    - Cisco (*Leucichthys artedi*).
    - Chinook, king, or quinnat salmon (*Oncorhynchus tschawytscha*).
    - Chum salmon (*Oncorhynchus keta*).
    - Pink or humpback salmon (*Oncorhynchus gorbuscha*).
    - Coho salmon, silver salmon (*Oncorhynchus kisutch*).
    - Red salmon, sockeye, or blueback salmon (*Oncorhynchus nerka*).
    - Steelhead salmon (*Salmo gairdneri*).
    - Atlantic salmon (*Salmo salar*).
    - Landlocked salmon (*Salmo sebago*).
    - Rainbow trout (*Salmo shasta*).
    - Golden trout (*Salmo roosevelti*).

SALMONS, TROUTS, AND WHITEFISHES (SALMONIDÆ)—Continued.
  Black-spotted trout, redthroat trout (*Salmo lewisi*).
  Loch Leven trout (*Salmo levenensis*).
  Lake trout, Mackinaw trout (*Cristivomer namaycush*).
  Brook trout (*Salvelinus fontinalis*).
  Dolly Varden trout (*Salvelinus malma*).
GRAYLINGS (THYMALLIDÆ): Montana grayling (*Thymallus montanus*).
PIKES (ESOCIDÆ): Common pickerel (*Esox reticulatus*).
SUNFISHES (CENTRARCHIDAE):
  Crappie (*Pomoxis annularis* and *P. sparoides*).
  Largemouth black bass (*Micropterus salmoides*).
  Smallmouth black bass (*Micropterus dolomieu*).
  Rock bass (*Ambloplites rupestris*).
  Warmouth bass, goggle-eye (*Chænobryttus gulosus*).
  Bluegill sunfish (*Lepomis incisor*).
  Green sunfish (*Lepomis cyanellus*).
  Redbreasted bream (*Lepomis auritus*).
  Red-eared sunfish (*Lepomis heros*).
  Common sunfish (*Lepomis gibbosus*).
  Rio Grande perch (*Herichthys cyanoguttatus*).
PERCHES (PERCIDAE):
  Pike perch (*Stizostedion vitreum*).
  Yellow perch, ringed perch (*Perca flavescens*).
WHITE BASSES (SERRANIDÆ):
  White bass (*Roccus chrysops*).
  Striped bass (*Roccus lineatus*).
  White perch (*Morone americana*).
DRUMS (SCIÆNIDAE): Fresh-water drum, lake sheepshead (*Aplodinotus grunniens*).
CODS (GADIDÆ):
  Cod (*Gadus callarias*).
  Haddock (*Melanogrammus æglefinus*).
  Pollock (*Pollachius virens*).
FLOUNDERS (PLEURONECTIDÆ): Winter flounder, American flatfish.
MACKEREL (SCOMBRIDÆ): Common mackerel (*Scomber scombrus*).

OUTPUT

The distribution for the fiscal year 1932 amounted to 7,073,935,200 eggs, fry, and fingerlings from all sources. This output represents a slight regression from that of the previous year, the drop of 47,870,500 being a decline of approximately six-tenths of 1 per cent.

In considering the aggregate output it is essential to analyze the totals with particular reference to the relative status of the various groups, since certain forms of relatively less importance may be handled in extremely large numbers and greatly affect the total, while not exerting any particular bearing upon the true status of the fisheries which are in greatest need of artificial aid. Such analysis is given in subsequent pages, but it is desirable to point out here the relative standing of the main classifications within the above total.

The aggregate output was divided into game fishes, 1.5 per cent; anadromous species (forms which resort to fresh water for spawning), 3.3 per cent; commercial species of interior waters, 17 per cent; marine species, 78 per cent; and approximately 2 per cent consisted of miscellaneous species. The bureau's classification of game fishes includes only those species which are not commercialized and omits several varieties, such as the lake trout and pike perch, which may be quite extensively sought by the angler. On the basis of this classification the game fishes showed a decline of almost 50 per cent, while the anadromous forms were only slightly below the records of the previous year. The marine species were also produced in smaller numbers than in the previous year, the drop being approximately 5 per cent, while a considerable increase in the output of commercial varieties of interior waters brought the total up to a point negligibly below that for the fiscal year 1931. In the case of the game fishes the size at which they are distributed is probably more significant than the actual number planted. A very sharp drop was in evidence here, the number of fingerlings and adults being 148,619,200, in comparison with over 320,000,000 distributed the previous year. However, the fingerlings actually produced at the hatcheries were approximately the same in number as in the preceding year, the decline in the aggregate being traceable to the marked curtailment in the distribution of rescued fishes from the upper Mississippi River overflowed areas. Practically all the forms handled from that source come in the fingerling category, and a reduction to less than one-third of the previous year's collections was reflected in a drop in the total fingerling output. Of the 49 species distributed 19 showed a decline; the remainder were distributed in moderately increased numbers as compared with the figures of the preceding year.

Summary, by species, of the output of fish and fish eggs during the fiscal year ended June 30, 1932

Species	Eggs	Fry	Fingerlings	Total
Catfish			12, 185, 000	12, 185, 000
Buffalofish	255, 255, 000		601, 000	255, 856, 000
Common sucker	17, 275, 000			17, 275, 000
Carp	227, 400, 000		20, 021, 000	247, 421, 000
Shad		29, 758, 000		29, 758, 000
Glut herring		55, 000, 000		55, 000, 000
Whitefish	5, 000, 000	64, 880, 000		69, 880, 000
Cisco		23, 000, 000		23, 000, 000
Chinook salmon	24, 880, 000	1, 450, 000	45, 850, 000	72, 180, 000
Chum salmon	400, 000	17, 878, 000	314, 000	18, 592, 000
Silver salmon	2, 166, 000	4, 074, 000	1, 617, 900	7, 857, 900
Sockeye salmon	3, 145, 000	18, 845, 000	2, 769, 200	24, 759, 200
Humpback salmon		8, 862, 000		8, 862, 000
Steelhead salmon	1, 143, 000		1, 380, 000	2, 523, 000
Atlantic salmon	450, 000		693, 700	1, 143, 700
Landlocked salmon	50, 000	10, 000	926, 700	986, 700
Rainbow trout	5, 898, 000		8, 055, 000	13, 953, 000
Golden trout	38, 000		12, 100	50, 100
Black-spotted trout	7, 783, 000	396, 000	8, 999, 000	17, 178, 000
Loch Leven trout	14, 822, 000	3, 167, 000	5, 154, 000	23, 143, 000
Lake trout	875, 000	23, 500, 000	1, 255, 300	25, 630, 300
Brook trout	1, 213, 000	1, 874, 000	14, 811, 000	17, 898, 000
Dolly Varden trout	2, 462, 000			2, 462, 000
Grayling		40, 000	1, 100	41, 100
Pike and pickerel			59, 000	59, 000
Mackerel		15, 245, 000		15, 245, 000
Crappie			6, 951, 000	6, 951, 000
Largemouth black bass		1, 342, 000	2, 157, 000	3, 499, 000
Smallmouth black bass		857, 000	244, 800	1, 101, 800
Rock bass			77, 200	77, 200
Warmouth bass			7, 000	7, 000
Sunfish			10, 357, 200	10, 357, 200
Pike perch	147, 544, 000	254, 060, 000		401, 604, 000
Yellow perch		181, 892, 000	384, 700	182, 276, 700
Striped bass		1, 676, 000		1, 676, 000
White perch		7, 000, 000	300	7, 000, 300
White bass			16, 700	16, 700
Rio Grande perch			16, 300	16, 300
Fresh-water drum			526, 000	526, 000
Cod	1, 284, 558, 000	344, 208, 000		1, 628, 766, 000
Haddock	723, 909, 000	76, 242, 000		800, 151, 000
Pollock		14, 670, 000		14, 670, 000
Winter flounder	81, 965, 000	2, 967, 159, 000		3, 049, 124, 000
Miscellaneous fishes			3, 176, 000	3, 176, 000
Total	2, 808, 231, 000	4, 117, 085, 000	148, 619, 200	7, 073, 935, 200

NOTE.—All carp shown in above table are planted in commercial fishing areas from which the eggs are secured.

COOPERATION WITH OTHER CONSERVATION AGENCIES

The attitude of the large sportsmen's organizations, individual sportsmen, and commercial fishing interests leaves no room for the conclusion that there is an excess distribution of hatchery fish or a surplus of facilities for their production. In view of this situation the operation of both Federal and State hatcheries within any given area can not fairly be considered a duplication of effort, since too frequently their combined output is not adequate to meet the purpose for which intended—namely, the maintenance of an abundant stock of food and game fishes. In the practical execution of these enterprises cooperative programs may be developed which will insure more effective work by the agencies concerned and prevent overlapping or duplication of effort in some particular area without affecting the essential truth that a vast field is not being thoroughly and adequately covered. This cooperation is largely in the nature of technical management and more effective routine administration. During the past year the bureau maintained effective and mutually beneficial affiliations with some 22 States. In the majority of cases the States were the principal beneficiaries, which is in line with the original concept of the bureau's activities to aid and promote State conservation work. The following citations constitute only a mention of some of the outstanding examples of the cooperative arrangements in effect, since it is not feasible to include a full summary of details of a more or less routine nature.

As heretofore, the Montana fisheries authorities assisted the bureau in the operation of the Miles City (Mont.) bass hatchery and interchanges of eggs between that State and the bureau were made which resulted in an appreciable saving to both agencies. In the work of propagating pike perch at its Lake Champlain hatchery the bureau received assistance from Pennsylvania and Vermont, and the first mentioned State assumed part of the work of distributing young trout to the cooperative sportsmen's nurseries operating within its boundaries. The most cordial relations were maintained with the State of Michigan in the collection of eggs of the commercial fishes of the Great Lakes, and similar arrangements prevailed in connection with the operation of the Federal and State salmon hatcheries in the States of Washington and Oregon. The bureau continued to hatch trout in considerable numbers at its West Virginia hatchery for account of that State. The bureau's only existing striped bass hatchery was operated jointly with the State of North Carolina, and the North Carolina authorities rendered material assistance in distributing game fish from the bureau's Albemarle Sound station. Virginia, Maryland, and a number of States in the Middle West have entered into joint distribution arrangements with the bureau which have resulted in considerable saving. In the Rocky Mountain area, where the collection of wild trout eggs is one of the most important features of fish-cultural endeavor, the bureau received State assistance, making it possible by virtue of the arrangements entered into to allocate eggs to these States in considerable numbers. During part of the year one of the bureau's employees was detailed to initiate trout-cultural work in South Carolina, and a similar plan was followed in Arkansas in connection with the development of the large bass hatchery operated by that State. During the latter part of the fiscal year plans were formulated by the bureau and the New York fisheries authorities for the cooperative management of a substation at Cortland, N. Y., to be devoted to fish-cultural research, and for the conduct of pond-cultural experiments near the city of Rochester, with the view of demonstrating the possibilities of local or community fish-cultural operations. A statement of further details along this line appears unnecessary, but the bureau feels that the sentiment in practically all of the States is such that when occasion arises cooperative relations of mutual benefit may be developed.

The bureau has been privileged to assist in the work of several of the larger public aquaria in the country and has received courtesies in kind.

The activities of the division of fish culture have contact to a limited extent with other Federal agencies, notably the Forest Service, the National Park Service, the Indian Service, and the Bureau of Reclamation. The Bureau of Fisheries has assumed responsibility for the greater part of all fisheries work involved in the maintenance of wild life in the national parks. Two hatcheries are now maintained exclusively for that purpose and a third, in the Mount Rainier National Park, is nearing completion. The vast national forest areas are to a great extent desirable game fish waters, and obviously it is a function of the bureau to maintain the fish population in this part of the public domain. While fish from the bureau's hatcheries have been allocated for stocking national forest waters for many years, such plantings have been of a more or less haphazard character, lacking the basis of a clear understanding of what was required and feasible. In addition to surveys of national park waters during the year, the bureau sent out several field parties to study selected national forest areas and formulate a stocking policy which may be adhered to in future distributions. Thus far such activity has been confined to the Rocky Mountain States, being centered in Utah, Idaho, and Colorado. It is the present policy to continue this work indefinitely, constantly extending it into new areas, until the vast domain of the national forests has been adequately charted in so far as fish life and the requirements for fish stocking are concerned.

The bureau again received assistance from the Indian Service in connection with the collection of black-spotted trout eggs at Pyramid Lake, Nev. In the course of the year efforts were initiated to attain closer contact with the Bureau of Reclamation, Department of the Interior, since the activities of that agency in constructing irrigation projects, particularly in the Northwest, have a strong bearing on the welfare of important fisheries. In most cases these fisheries may be preserved or subjected to a minimum damage by giving attention to the installation of adequate fish ladders in the dams or by the proper screening of diversions. The main thought for consideration in connection with both State and Federal agencies working in allied fields is to assure that the various projects shall be actually carried on by the agency best qualified to accomplish effectively the object sought, at the lowest practicable cost.

COOPERATIVE FISH NURSERIES

It is evident that the economic stress has affected the ability of sportsmen's organizations to carry on independent projects to supplement the work of the Federal hatcheries. One of the most promising developments of this nature was the cooperative nursery system whereby fish which were being distributed from hatcheries, due to lack of facilities for rearing, were taken over by the sportsmen, cared for, and fed in suitable nursery ponds or pools. Some expense to the sportsmen was involved in the construction of the pools and the cost of fish food and necessary attention. The bureau distributed practically the same number of fish to fewer nurseries during the fiscal year 1932, which indicates that the burdens of expense, slight though they may be, were beyond the resources of some organizations. However, this weeding out process has not been without benefit, since the nurseries which have remained in operation are the better supported units, with superior facilities, and offer more favorable prospects for the production of larger numbers of large sized fish. A number of the States have taken over such work, providing fish from their own hatcheries and in some cases making a grant or subsidy to defray part of the cost formerly borne by the sportsmen. Practical considerations will make it impossible for the bureau to adopt the latter plan, and it is highly desirable that there be a gradual transfer of these cooperative nurseries to State auspices, whereby closer supervision may be maintained and more satisfactory results achieved.

Among the larger projects which have continued affiliations with the bureau are those at Barneveld, N. Y.; Ogletown, Pa.; Watertown, N. Y.; Turtle Lake, Mich.; and Clare County, Mich. The latter is of particular interest, in that it represents an effort on the part of a community which derives direct financial benefit from its game fishing waters to assure the perpetuation and maintenance of this asset. In summary, the number of nurseries to which the bureau furnished fish, or which received fish from other sources at the instance of the bureau, declined from 119 in the fiscal year 1931 to 116 in the fiscal year 1932. There follows a tabulation of their location, with a summary of the fish supplied.

Cooperative nurseries and rearing ponds supervised by the bureau in 1932

Locality	Number of fish supplied	Kind
Maryland:		
Catoctin	50,000	Rainbow trout.
Do	87,500	Brook trout.
Williamsport	50,000	Black bass.
Massachusetts:		
Adams	30,000	Brook trout.
Chester	5,800	Do.
Florence	2,600	Do.
Great Barrington	10,000	Do.
Holyoke	25,000	Do.
Lowell	12,000	Do.
Ludlow	4,000	Do.
Pittsfield	20,000	Do.
Springfield	33,150	Do.
Michigan:		
Harrison	200,000	Do.
Highland	5,000	Do.
Do	5,000	Loch Leven trout.
Do	5,000	Rainbow trout.
Hillman	325,000	Brook trout.
Rose City	150,000	Do.
Do	30,000	Loch Leven trout.
Spruce	50,000	Brook trout.
Minnesota:		
Anoka	5,000	Do.
Lake City	3,000	Do.
Minnesota—Contd.		
Mora	5,000	Brook trout.
Northfield	5,250	Rainbow trout.
Red Wing	16,000	Brook trout.
Rochester	6,000	Do.
Rushford	25,000	Rainbow trout.
St. Charles	2,000	Brook trout.
Winona	20,000	Loch Leven trout.
Do	28,000	Brook trout.
Do	20,000	Rainbow trout.
New Hampshire:		
Concord	8,000	Brook trout.
Manchester	12,000	Do.
Merrimack	10,000	Do.
Milford	15,000	Do.
Peterboro	25,000	Do.
Portsmouth	8,000	Do.
New York:		
Adams	5,075	Do.
Arena	25,000	Loch Leven trout.
Barneveld	450,000	Brook trout eggs.
Do	119,000	Rainbow trout eggs.
Forestport	23,000	Brook trout.
Malone	69,500	Do.
Oneonta	57,500	Do.
Watertown	100,000	Do.

Cooperative nurseries and rearing ponds supervised by the bureau in 1932—Continued

Locality	Number of fish supplied	Kind
Pennsylvania:		
Altoona	80,000	Brook trout
Berwick	40,000	Do.
Do	15,000	Rainbow trout.
Do	15,000	Loch Leven trout.
Bloomsburg	20,000	Brook trout.
Do	10,000	Loch Leven trout.
Fairmount Springs	35,000	Brook trout.
Galeton	40,000	Do.
Hazleton	15,000	Do.
Do	15,000	Rainbow trout.
Indiana	10,000	Brook trout.
Johnsonburg	10,000	Do.
Johnstown	10,000	Do.
Do	10,200	Rainbow trout.
Ligonier	15,000	Brook trout.
Do	15,000	Rainbow trout.
Do	10,400	Loch Leven trout.
Marienville	10,000	Brook trout.
Muncy	35,000	Do.
Do	30,000	Loch Leven trout.
Meyersdale	30,000	Brook trout.
Ogletown	200,000	Brook trout eggs.
Pittston	20,000	Brook trout.
Do	5,000	Loch Leven trout.
Punxsutawney	10,000	Brook trout.
Scranton	40,000	Rainbow trout.
Do	20,000	Loch Leven trout.
Shamokin	15,200	Do.
Stroudsburg	15,000	Brook trout.
Troy	15,000	Do.
White Haven	25,000	Do.
Williamsport	100,000	Do.
Do	15,200	Loch Leven trout.
Vermont:		
Averill	101,000	Brook trout.
Do	30,000	Lake trout.
Do	39,000	Landlocked salmon.
Bennington	62,700	Brook trout.
Weston	40,000	Do.
Virginia:		
Shawsville	10,500	Do.
Warm Springs	5,700	Do.
Do	8,000	Rainbow trout.
Woodbridge	14,880	Black bass.
West Virginia:		
Durbin	40,000	Brook trout.
Do	10,000	Rainbow trout.
Wisconsin:		
Arcadia	15,000	Brook trout.
Bay City	5,000	Do.
Boscobel	19,500	Do.
Do	5,250	Rainbow trout.
Boyd	8,000	Brook trout.
Darlington	5,950	Rainbow trout.
Eau Claire	13,000	Brook trout.
Do	40,000	Rainbow trout.
Ellsworth	30,000	Do.
Do	10,000	Brook trout.
Elmwood	5,000	Do.
El Paso	10,000	Do.
Elroy	20,800	Do.
Galesville	20,000	Do.
Hatley	20,000	Do.
Hazel Green	12,000	Do.
Holmen	8,000	Do.
Independence	20,000	Do.
La Crosse	17,600	Do.
Do	20,000	Loch Leven trout.
Laona	30,000	Brook trout.
Madison	5,200	Do.
Do	5,000	Loch Leven trout.
Manitowoc	11,400	Rainbow trout.
Marathon	20,000	Brook trout.
Medford	5,000	Do.
Monroe	15,000	Do.
Do	4,000	Loch Leven trout.
Merrill	20,000	Brook trout.
Mountain	20,000	Do.
Nekoosa	20,000	Do.
Osseo	10,000	Do.
Park Falls	15,000	Do.
Plum City	3,000	Do.
Do	7,000	Rainbow trout.
Prescott	30,000	Brook trout.
Rothschild	13,000	Do.
Shullsburg	10,000	Loch Leven trout.
Stanley	20,000	Brook trout.
Stevens Point	10,000	Do.
Do	19,850	Rainbow trout.
Tunnel City	10,000	Brook trout.
Viola	8,000	Do.
Viroqua	21,000	Loch Leven trout.
Westby	12,000	Do.
Whitehall	2,000	Brook trout.
Total	4,126,705	

STATE FISH-CULTURAL ACTIVITIES

Data on State fish-cultural activities and licenses

State	Number of fishing licenses issued	Fees received from licenses	Number of hatcheries	Number of fish-cultural employees	Expenditures for propagation of fish
Alabama	476	$2,380.00	1	2	----------
Arizona	25,000	62,000.00	4	7	$15,143.20
Arkansas	18,589	39,641.60	2	1	25,500.00
California	242,394	496,390.00	28	130	296,773.66
Colorado	106,466	196,199.00	15	26	95,000.00
Connecticut	37,188	132,649.30	4	13	68,615.76
Delaware	1,997	4,723.47	----------	----------	78.46
Florida [1]	20,415	58,527.00	----------	----------	20,312.89
Georgia	----------	----------	1	2	2,040.00
Idaho	74,731	155,469.40	11	16	76,198.47
Illinois	425,000	175,000.00	7	7	70,000.00
Indiana	312,814	295,344.80	5	15	----------
Iowa	241,677	241,677.00	4	7	36,533.58
Kansas	85,329	85,329.00	----------	5	----------

[1] Amounts given are for fiscal year 1931.

Data on State fish-cultural activities and licenses—Continued

State	Number of fishing licenses issued	Fees received from licenses	Number of hatcheries	Number of fish-cultural employees	Expenditures for propagation of fish
Kentucky	55,377	$49,691.30	4	3	$24,487.57
Louisiana	12,000	12,700.00	4	10	12,331.89
Maine	85,665	119,689.00	31	45	199,307.52
Maryland	12,954	16,543.54	6	8	15,046.99
Massachusetts	114,555	320,289.10	7	9	49,165.25
Michigan	121,286	200,716.00	15	85	289,844.11
Minnesota	439,758	373,419.45	13	31	131,394.40
Missouri	259,637	310,410.81	7	4	43,286.39
Montana	70,422	146,388.00	14	20	79,854.97
Nebraska	175,000	175,000.00	20	21	100,000.00
Nevada	7,018	11,044.00	1	4	
New Hampshire	72,620	154,723.10	6	30	127,967.08
New Jersey	193,423	279,053.10	2	15	82,307.30
New Mexico	20,468	54,431.25	5	12	55,000.00
New York	505,561	1,047,063.34	10	135	285,000.00
North Carolina	18,986	33,237.25	5	4	26,389.81
North Dakota	22,616	9,826.90	3	6	5,494.98
Ohio	98,478	100,674.85	13	52	125,164.37
Oklahoma	50,023	60,212.75	5	10	
Oregon	80,617	285,521.23	37	150	220,073.04
Pennsylvania	255,062	395,760.00	8	31	278,174.22
Rhode Island	11,849	13,765.65	1	6	22,400.00
South Carolina	166	1,660.00	1	2	5,000.00
South Dakota	48,044	53,490.00	6	10	31,568.96
Tennessee					
Texas	36,500	36,500.00	9	20	45,000.00
Utah	44,784	94,840.60	8	18	48,000.00
Vermont	63,765	90,803.20	5	15	65,603.60
Virginia [2]	35,096	125,663.50	1	4	26,868.98
Washington [3]	23,764	143,283.00	28	107	132,887.70
West Virginia	150,400	194,000.00	3	3	19,000.00
Wisconsin	59,953	161,603.10	20	43	132,918.96
Wyoming	39,899	117,000.00	8	12	56,591.07
Total	4,777,822	7,134,334.59	388	1,156	3,442,325.18

[2] In addition to above 95,178 county licenses were issued in Virginia, valued at $95,178.

[3] 13 county hatcheries not accounted for above were operated in the State of Washington, and 195,719 county fishing licenses, valued at $296,791.50, were issued.

Output of fish by State hatcheries

State	Trout	Bass	Other game fish	Commercial species	Total
Alabama		146,204	415,125		561,329
Arizona	1,270,408				1,270,408
Arkansas		437,295	284,075	507,450	1,228,820
California	33,145,279		2,350	4,375,940	37,523,569
Colorado	26,083,146		725,500		26,808,646
Connecticut	415,634	37,852	65,359,744	111,488,439	177,301,669
Delaware		576	5,006		5,582
Florida		701,900			701,900
Georgia	205,000	10,000	30,000		245,000
Idaho	9,405,747				9,405,747
Indiana		934,087	13,325,450		14,259,537
Iowa	14,108	547,925	99,087,222		99,649,255
Kansas		60,200	622,400		682,600
Kentucky		264,530	128,855		393,385
Louisiana		130,000	200,000		330,000
Maine	6,549,401		3,807,268		10,356,669
Maryland	10,463	27,846	672,576	370,380,400	371,091,285
Massachusetts	610,951	227,152	626,010		1,464,113
Michigan	11,093,000	494,900	43,378,900	131,102,000	186,068,800
Minnesota	8,336,585	90,240	2,172,804	780,115,632	790,715,261
Missouri	450,156	384,661	983,311	131,996	1,950,124
Montana	25,505,273	224,543	2,492,989		28,222,805
Nebraska	480,950	1,016,479	1,866,220		3,363,649
Nevada	809,040		[1] 126,560		935,600
New Hampshire	4,428,033	105,970	242,520		4,776,523
New Jersey	571,817	127,900	116,264,655	805,000	117,769,372

[1] Of these 126,480 were silverside salmon.

Output of fish by State hatcheries—Continued

State	Trout	Bass	Other game fish	Commercial species	Total
New Mexico	1,992,215	12,000	11,882		2,016,097
New York	9,907,555	633,342	9,499,337	619,742,671	639,782,905
North Carolina	3,700,200	346,380	2,458,569		6,505,149
North Dakota		15,795	3,499,120		3,514,915
Ohio		184,206	2,666,406	161,260,000	164,110,612
Oklahoma		1,079,800	464,975		1,544,775
Oregon	22,451,400	29,800	983,200	85,226,510	108,690,910
Pennsylvania	1,000,604	387,474	1,702,582	514,980,797	518,071,457
Rhode Island	82,097	15,167	15,531		112,795
South Carolina	500,000				500,000
South Dakota	294,385	13,882	4,268,249		4,576,516
Texas		328,000	1,658,047		1,986,047
Utah	7,500,000				7,500,000
Vermont	316,095	32,760	748	61,660,000	62,009,603
Virginia	149,940	45,386		40,355,225	40,550,551
Washington	47,893,261	235,000		173,190,173	221,318,434
West Virginia	366,750	223,670	17,000		607,420
Wisconsin	7,092,091	695,119	1,995,649	367,963,636	377,746,495
Wyoming	14,140,000				14,140,000
Total	246,771,584	10,248,041	382,060,835	3,423,285,869	4,062,366,329

In presenting the foregoing tables the bureau wishes to emphasize that they do not form a complete statistical summary. They are submitted with a full knowledge that they are merely indicative of the general trend of fisheries conservation work on the part of the States. The data were compiled from information supplied by the State authorities, and in a number of instances all of the statistics requested were not furnished. In at least one instance no information whatever was forthcoming. These facts account for the existing voids and prevent the tables from presenting a completely accurate picture of the magnitude of State fish-cultural activities and expenditures. Furthermore, due to the fact that some of the States employ a fiscal year corresponding with the calendar year, while in others the end of June indicates the close of the business year, the periods covered by the data shown are not on the same basis in every case. The tables are submitted, therefore, merely as an approximation of an average year's endeavor in fish culture and allied fields on the part of the States. In every case the information covers the latest complete year for which statistics are available.

In comparison with data collected in an almost identical manner last year, it is noticeable that there was a reduction of over 800,000 in the number of fishing licenses issued and that receipts from the sale of licenses declined to the extent of slightly over $400,000. The character of the fishing licenses listed in the tables should be explained. The term "fishing licenses" as used comprises all licenses carrying the privilege of fishing. It, therefore, includes a very large number of the so-called combination licenses generally sold to residents which carry the privilege of fishing, hunting, and even trapping in a single permit. Obviously not all licensees of this class purchase a license for the purpose of fishing, but the figures are included as an indication of the number of potential anglers. The tables show an increase of 4 over last year in the number of State fish hatcheries and a decline of 73 in the number of employees. Expenditures for fish-cultural work receded somewhat, being some $200,000 below those of the previous year. The total output of fish of all species is virtually the same as in the previous report, a decline of over a million in the output of bass being balanced by a corresponding increase in the distribution of trout and other game fish. The distribution of commercial species by the States was only slightly changed from the output of the previous year.

The curtailment of income of the State fish and game departments, resulting chiefly from a drop in number of licenses issued, is reflected in smaller expenditures for propagation. This handicap was largely overcome, however, by increased efficiency in conducting the work, and through such means the output of fish closely approximated the figures of preceding years.

Again the bureau wishes to stress a point emphasized in previous issues of its reports, namely, that a numerical comparison of output between the various States is misleading and unfair in the absence of definite knowledge as to the size of the fish distributed. It is obvious that a State distributing game fish of legal size, as a considerable number of them do, can not hope to compete in numbers with a State which plants newly hatched fish or small fingerlings. The fact that a State distributes twice or three times as many trout or bass as another should not constitute a basis for invidious comparison without taking into account the details of their respective distribution practices.

SALVAGE OPERATIONS

The comparatively normal water conditions in the upper Mississippi River area, including the Upper Mississippi Wild Life Fish and Game Refuge territory, rendered extensive rescue or salvage operations unnecessary. The total collection of 51,611,367 stranded fish represents a marked reduction from the all-time record of the previous year, being only about one-third of the number handled in 1931. The rescued fishes were mainly returned, as usual, to the main channel of the Mississippi River, as is shown by the following tabulation:

Number and disposition of fish rescued, fiscal year 1932

Locality and species	Delivered to applicants	Restored to original waters	Total number of fish rescued
All stations:			
Buffalofish		600, 830	600, 830
Carp		20, 020, 600	20, 020, 600
Catfish	15, 730	12, 043, 900	12, 059, 630
Crappie	22, 335	6, 723, 105	6, 745, 440
Fresh-water drum		525, 375	525, 375
Largemouth black bass	79, 980	178, 087	258, 067
Pike and pickerel		58, 485	58, 485
Sunfish	66, 760	7, 826, 015	7, 892, 775
White bass		16, 665	16, 665
Yellow perch	6, 655	266, 275	272, 930
Miscellaneous		3, 160, 570	3, 160, 570
Total	191, 460	51, 419, 907	51, 611, 367
Summary by stations:			
Bellevue, Iowa	2, 000	9, 776, 885	9, 778, 885
Homer, Minn	98, 960	17, 912, 590	18, 011, 550
La Crosse, Wis	71, 490	6, 782, 080	6, 853, 570
Lynxville, Wis	9, 085	7, 159, 695	7, 168, 780
Marquette, Iowa	9, 925	9, 788, 657	9, 798, 582
Total	191, 460	51, 419, 907	51, 611, 367

TRANSFERS OF EGGS BETWEEN STATIONS

The following table, showing transfers of eggs between the various stations of the bureau, illustrates the interdependence of a nation-wide system of hatcheries. Were it not possible to effect these transfers between the different units of the bureau's hatchery system, the receiving stations could secure their supplies only at a greatly increased cost, and at several stations no supplies whatever of certain species would be obtainable. A definite program is now under way for the development of certain stations, particularly the one at York Pond, N. H., and several of the stations in the Rocky Mountain area, as a source of supply for trout eggs for the remainder of the hatcheries handling these forms.

Transfer of eggs between stations, fiscal year 1932

Species	Number of eggs	From—	To—
Atlantic salmon	50,000	Craig Brook, Me	Grand Lake Stream, Me.
Black-spotted trout	225,000	Creede, Colo	Leadville, Colo.
	18,000	Pittsford, Vt	Cape Vincent, N. Y.
	27,000	do	Leetown, W. Va.
	271,000	Springville, Utah	Bozeman, Mont.
	77,000	do	Creede, Colo.
	97,000	do	Leadville, Colo.
	25,000	Yellowstone Park, Wyo	Birdsview, Wash.
	125,000	do	Quilcene, Wash.
	200,000	do	Salmon, Idaho.
	100,000	do	Leadville, Colo.
	25,000	do	Quinault, Wash.
	1,000,000	do	Puget Sound stations.
Brook trout	246,000	Madison Valley, Mont	Bozeman, Mont.
	250,000	Craig Brook, Me	Cape Vincent, N. Y.
	100,000	do	Barneveld, N. Y.
	150,000	do	Cortland, N. Y.
	600,000	do	Erwin, Tenn.
	250,000	do	Manchester, Iowa.
	1,000,000	do	White Sulphur Springs, W. Va.
	100,000	do	Wytheville, Va.
	350,000	Leadville, Colo	Cape Vincent, N. Y.
	75,000	do	La Crosse, Wis.
	250,000	do	Manchester, Iowa.
	5,000	do	Springville, Utah.
	100,000	do	White Sulphur Springs, W. Va.
	100,000	Creede, Colo	Bozeman, Mont.
	225,000	do	Springville, Utah.
	262,000	Pittsford, Vt	Leetown, W. Va.
	300,000	Springville, Utah	Bozeman, Mont.
	250,000	do	Manchester, Iowa.
	250,000	do	Saratoga, Wyo.
Chinook salmon	25,000	Little White Salmon, Wash	Clackamas, Oreg.
	2,000,000	do	Salmon, Idaho.
	2,650,000	do	Puget Sound stations.
Chum salmon	25,000	do	Clackamas, Oreg.
	2,600,000	Quilcene, Wash	Duckabush, Wash.
Cisco	400,000	Cape Vincent, N. Y	Nashua, N. H.
Dolly Varden trout	2,462,000	Afognak, Alaska	Puget Sound stations.
Grayling	6,000	Pittsford, Vt	Leetown, W. Va.
Lake trout	7,000	Cape Vincent, N. Y	Nashua, N. H.
Landlocked salmon	50,000	Craig Brook, Me	Grand Lake Stream, Me.
	25,000	do	Nashua, N. H.
	25,000	do	St. Johnsbury, Vt.
	400,000	Grand Lake Stream, Me	Craig Brook, Me.
Loch Leven trout	100,000	Bozeman, Mont	Cape Vincent, N. Y.
	100,000	do	Erwin, Tenn.
	400,000	do	La Crosse, Wis.
	200,000	do	Leadville, Colo.
	250,000	do	Creede, Colo.
	50,000	do	Leetown, W. Va.
	100,000	do	Northville, Mich.
	368,000	do	Puget Sound Stations.
	245,000	do	Saratoga, Wyo.
	495,000	do	Spearfish, S. Dak.
	193,000	do	Crawford, Nebr.
	458,000	do	Springville, Utah.
	345,000	do	White Sulphur Springs, W. Va
	100,000	do	Wytheville, Va.
	10,917,000	Madison Valley, Mont	Bozeman, Mont.

Transfer of eggs between stations, fiscal year 1932—Continued

Species	Number of eggs	From—	To—
Rainbow trout	1,025,000	Madison Valley, Mont	Bozeman, Mont.
	100,000	do	Glacier Park, Mont.
	75,000	Salmon, Idaho	Birdsview, Wash.
	293,000	Manchester, Iowa	La Crosse, Wis.
	375,000	Neosho, Mo	Leadville, Colo.
	237,000	do	Saratoga, Wyo.
	100,000	Bourbon, Mo	Cortland, N. Y.
	250,000	do	La Crosse, Wis.
	100,000	do	Leetown, W. Va.
	25,000	do	Springville, Utah.
	75,000	Creede, Colo	Bozeman, Mont.
	211,000	do	Leadville, Colo.
	75,000	do	Saratoga, Wyo.
	75,000	do	Crawford, Nebr.
	25,000	Eagle Nest Lake, N. Mex	Barneveld, N. Y.
	300,000	do	Leadville, Colo.
	142,000	do	Creede, Colo.
	170,000	do	Saratoga, Wyo.
	6,000	Pittsford, Vt	Cape Vincent, N. Y.
	185,000	Spearfish, S. Dak	Crawford, Nebr.
	500,000	Springville, Utah	Bozeman, Mont.
	100,000	do	Leadville, Colo.
	160,000	do	Creede, Colo.
	100,000	White Sulphur Springs, W. Va.	Leetown, W. Va.
	211,000	Wytheville, Va	White Sulphur Springs, W. Va.
Silver salmon	25,000	Applegate Creek, Oreg	Clackamas, Oreg.
	750,000	Sultan, Wash	Birdsview, Wash.
Sockeye salmon	3,145,000	Yes Bay, Alaska	Puget Sound stations.
Steelhead salmon	75,000	Birdsview, Wash	Salmon, Idaho.
	50,000	Applegate Creek, Oreg	Charlevoix, Mich.
	50,000	do	Puget Sound stations.
	30,000	Birdsview, Wash	St. Johnsbury, Vt.

ASSIGNMENTS OF FISH EGGS TO STATES, TERRITORIES, AND FOREIGN COUNTRIES

The following data show the extent to which the bureau is able to aid fish-cultural activities in a number of the States. While some of the shipments listed were made on an exchange basis, and others were furnished as compensation for cooperative aid extended in making the collections, a very large number of the eggs supplied to the States constitute outright donations in the interest of fish conservation work. The total of 149,501,000 eggs thus disposed of represents an increase of approximately 50,000,000 over the number supplied in the previous year. Eggs were furnished to 23 States and the Territory of Alaska, as opposed to a total of 21 States and Alaska receiving such material in 1931. It will be noted that the majority of the shipments consisted of trout and salmon eggs, the species which are most amenable to shipment and for which there is the greatest demand.

While the assignment of over 2,000,000 eggs to foreign countries represents a numerical increase over the total of the preceding year, the actual extent of such shipments was in reality curtailed, since all but 75,000 of this number consisted of trout eggs furnished to the Canadian Government on an exchange basis. The small lots of trout eggs forwarded to South America and Central America were for experimental work in the acclimatization of these forms in the countries listed. The requests of foreign governments for eggs of American fishes have diminished appreciably in recent years, indicating either that earlier shipments have sufficed to provide an initial stock or that the introduced forms have failed to thrive under the changed conditions.

Assignments of fish eggs, fiscal year 1932

TO STATE AND TERRITORIAL FISH COMMISSIONS

State, or country, and species	Number
Arizona: Loch Leven trout	1,000,000
California:	
Atlantic salmon	25,000
Chinook salmon	3,780,000
Colorado:	
Black-spotted trout	224,000
Brook trout	100,000
Lake trout	100,000
Loch Leven trout	500,000
Rainbow trout	50,000
Steelhead salmon	50,000
Connecticut: Loch Leven trout	150,000
Georgia: Rainbow trout	200,000
Hawaii: Steelhead salmon	33,000
Idaho: Rainbow trout	775,000
Iowa: Rainbow trout	101,000
Maine:	
Atlantic salmon	400,000
Lake trout	300,000
Maryland: Rainbow trout	100,000
Massachusetts:	
Loch Leven trout	100,000
Rainbow trout	50,000
Michigan: Landlocked salmon	25,000
Montana:	
Black-spotted trout	271,000
Loch Leven trout	5,034,000
Rainbow trout	991,000
Silver salmon	500,000
Whitefish	5,000,000
Nevada:	
Black-spotted trout	189,000
Rainbow trout	400,000
New Mexico:	
Black-spotted trout	106,000
Chinook salmon	200,000
Loch Leven trout	1,000,000
Rainbow trout	1,439,000
New York: Loch Leven trout	250,000
North Carolina:	
Loch Leven trout	100,000
Rainbow trout	200,000
Ohio: Pike perch	104,050,000
Oregon:	
Black-spotted trout	1,000,000
Chinook salmon	8,353,000
Chum salmon	400,000
Silver salmon	400,000
Steelhead salmon	630,000
Tennessee: Rainbow trout	25,000
Utah:	
Black-spotted trout	50,000
Lake trout	100,000
Loch Leven trout	750,000
Vermont: Loch Leven trout	75,000
Washington:	
Black-spotted trout	25,000
Chinook salmon	6,010,000
Loch Leven trout	200,000
Wyoming:	
Black-spotted trout	1,000,000
Brook trout	500,000
Chinook salmon	100,000
Lake trout	100,000
Loch Leven trout	1,000,000
Rainbow trout	925,000
Silver salmon	65,000
Total	149,501,000

TO FOREIGN COUNTRIES

State, or country, and species	Number
Canada:	
Black-spotted trout	766,000
Lake trout	250,000
Loch Leven trout	500,000
Rainbow trout	500,000
Ecuador: Rainbow trout	25,000
Panama:	
Brook trout	25,000
Rainbow trout	25,000
Total	2,091,000

OUTPUT OF STATIONS AND SUBSTATIONS

The bureau's 1932 output of fish was derived from 84 stations and substations, located in 35 States and the Territory of Alaska. For various reasons three of the minor egg-collecting fields occupied the previous year were not opened, reducing by that number the total of fish-producing units in operation. This year's list shows a production for the new establishments at Leetown, W. Va., and Dexter, N. Mex. All of the main stations which were on a producing basis in 1931 were in operation in 1932.

Stations and substations operated and the output of each, fiscal year 1932

[Asterisk (*) denotes transfer of eggs. See table, p. 542]

Stations, substations, and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total [1]
Afognak, Alaska:				
Dolly Varden trout	2,462,000			2,462,000
Sockeye salmon		19,920,512		19,920,512
Baird, Calif:				
Chinook salmon	4,536,000		6,240,000	10,776,000
Battle Creek, Calif.—				
Chinook salmon			9,507,300	9,507,300
Mill Creek, Calif.—				
Chinook salmon	4,284,000	800,000	3,915,000	8,999,000
Baker Lake, Wash.:				
Brook trout			25,375	25,375
Loch Leven trout			131,600	131,600
Silver salmon		15,400		15,400
Sockeye salmon			1,426,000	1,426,000
Birdsview, Wash.—				
Black-spotted trout	(*)		96,000	96,000
Chinook salmon			1,010,000	1,010,000
Humpback salmon		3,743,000		3,743,000
Rainbow trout			69,500	69,500
Silver salmon		1,668,000	271,000	1,939,000
Sockeye salmon			92,540	92,540
Steelhead salmon	*143,000		616,000	759,000
Duckabush, Wash.—				
Chinook salmon			535,000	535,000
Chum salmon		9,179,500		9,179,500
Humpback salmon		2,790,000		2,790,000
Silver salmon			302,000	302,000
Steelhead salmon			19,000	19,000
Quilcene, Wash.—				
Black-spotted trout			115,000	115,000
Brook trout			13,000	13,000
Chinook salmon			530,000	530,000
Chum salmon	(*)	8,127,250		8,127,250
Humpback salmon		1,978,800		1,978,800
Silver salmon		540,000	629,000	1,169,000
Steelhead salmon	50,000		380,000	430,000
Sultan, Wash.—				
Chinook salmon		200,000		200,000
Humpback salmon		33,000		33,000
Silver salmon	(*)	1,850,000	100,000	1,950,000
Steelhead salmon			270,600	270,600
Berkshire trout hatchery, Mass.:				
Brook trout	* 7,000		272,860	279,860
Catfish			7,840	7,840
Rainbow trout			1,000	1,000
Smallmouth black bass		56,000		56,000
Boothbay Harbor, Me.:				
Cod	915,741,000			915,741,000
Winter flounder		2,243,417,000		2,243,417,000
Bozeman, Mont.:				
Black-spotted trout			1,394,700	1,394,700
Brook trout			272,885	272,885
Golden trout	38,000		12,096	50,096
Landlocked salmon			13,000	13,000
Loch Leven trout	* 5,740,000		[2] 194,325	5,934,325
Rainbow trout	501,000		1,271,991	1,772,991
Glacier Park, Mont.—				
Black-spotted trout			489,200	489,200
Rainbow trout			400,200	400,200
Madison Valley, Mont.—				
Black-spotted trout			732,900	732,900
Brook trout	(*)			
Loch Leven trout	* 9,081,900	3,064,400	2,701,800	14,848,100
Rainbow trout	* 620,300		906,696	1,526,996

[1] Lost in transit 96,125.

[2] In addition to 32,000 fingerling Loch Leven trout turned over to the State of Montana in cooperative work.

Stations and substations operated and the output of each, fiscal year 1932—Contd.

[Asterisk (*) denotes transfer of eggs. See table, p. 542]

Stations, substations, and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
Bozeman, Mont.—Continued.				
Miles City, Mont.—				
Largemouth black bass			[3] 55,210	55,210
Catfish			[4] 9,450	9,450
Crappie			[5] 44,925	44,925
Sunfish			[6] 595,582	595,582
Yellow perch			[7] 52,287	52,287
Miscellaneous fishes			[8] 15,207	15,207
Cape Vincent, N. Y.:				
Black-spotted trout		17,000		17,000
Brook trout		44,000		44,000
Cisco	(*)	23,000,000		23,000,000
Lake trout	(*)	121,000		121,000
Loch Leven trout		87,500		87,500
Rainbow trout			54,000	54,000
Smallmouth black bass		257,000	33,715	290,715
Whitefish		410,000		410,000
Yellow perch		1,800,000		1,800,000
Barneveld, N. Y.—				
Brook trout			302,995	302,995
Lake trout			25,900	25,900
Loch Leven trout			32,600	32,600
Rainbow trout			9,700	9,700
Ithaca, N. Y.—				
Brook trout			35,200	35,200
Lake trout			200	200
Loch Leven trout			[9] 64,650	64,650
Swanton, Vt.—				
Common sucker	17,275,000			17,275,000
Pike perch	33,494,000	[10] 29,800,000		63,294,000
Yellow perch		64,100,000		64,100,000
Watertown, N. Y.—				
Brook trout			275,455	275,455
Lake trout			19,400	19,400
Loch Leven trout			139,500	139,500
Rainbow trout			12,300	12,300
Clackamas, Oreg.:				
Brook trout	1,000		1,500	2,500
Chinook salmon			1,000,000	1,000,000
Chum salmon			22,000	22,000
Loch Leven trout			120,000	120,000
Silver salmon			16,900	16,900
Applegate Creek, Oreg.—				
Silver salmon	400,000		299,900	699,900
Steelhead salmon	950,000			950,000
Big White Salmon, Wash.—				
Brook trout			63,600	63,600
Chinook salmon	8,934,000	450,000	7,764,000	17,148,000
Loch Leven trout		15,000	25,000	40,000
Steelhead salmon			17,650	17,650
Little White Salmon, Wash.—				
Chinook salmon	* 7,120,000		9,680,000	16,800,000
Chum salmon	* 400,000	571,000	292,000	1,263,000
Rogue River, Oreg.—				
Chinook salmon			3,054,870	3,054,870
Salmon, Idaho—				
Black-spotted trout			187,100	187,100
Chinook salmon			2,588,500	2,588,500
Rainbow trout	* 250,000		[11] 837,500	1,087,500
Cold Springs, Ga.:				
Largemouth black bass		182,000	471,300	653,300
Catfish			2,340	2,340
Sunfish			372,500	372,500
Valdosta, Ga.—				
Largemouth black bass			1,420	1,420
Catfish			200	200
Sunfish			[12] 7,165	7,165

[3] In addition to 30,450 fingerling largemouth black bass turned over to the State of Montana in cooperative work.

[4] In addition to 7,325 fingerling catfish turned over to the State of Montana in cooperative work.

[5] In addition to 27,775 fingerling crappie turned over to the State of Montana in cooperative work.

[6] In addition to 403,225 fingerling sunfish turned over to the State of Montana in cooperative work.

[7] In addition to 42,005 fingerling yellow perch turned over to the State of Montana in cooperative work.

[8] Turned over to the State of Montana in cooperative work.

[9] In addition to 10,000 fingerling Loch Leven trout turned over to the State of New York in cooperative work.

[10] In addition to 11,018,000 fry pike perch turned over to the State of Vermont in cooperative work.

[11] In addition to 270,000 fingerling rainbow trout turned over to the State of Idaho in cooperative work.

[12] In addition to 500 fingerling sunfish turned over to the State of Texas in cooperative work.

Stations and substations operated and the output of each, fiscal year 1932—Contd.

[Asterisk (*) denotes transfer of eggs. See table, p. 542]

Stations, substations, and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
Craig Brook, Me.:				
Atlantic salmon	* 425, 000		537, 150	962, 150
Brook trout	(*)		905, 150	905, 150
Landlocked salmon	* 50, 000		[13] 595, 900	645, 900
Grand Lake Stream, Me.—				
Atlantic salmon			151, 300	151, 300
Brook trout			30, 370	30, 370
Landlocked salmon	(*)		297, 900	297, 900
Dexter, N. Mex.:				
Largemouth black bass		[14] 18, 000	[15] 48, 450	66, 450
Duluth, Minn.:				
Brook trout			167, 900	167, 900
Lake trout	150, 000	6, 750, 000	[16] 1, 209. 750	8, 109, 750
Pike perch		15, 960, 000		15, 960, 000
Whitefish		870, 000		870, 000
Edenton, N. C.:				
Largemouth black bass		[17] 371, 500	[18] 84, 355	455, 855
Crappie			450	450
Glut herring		55, 000, 000		55, 000, 000
Sunfish			[19] 1, 805	1, 805
White perch		7, 000, 000		7, 000, 000
Yellow perch		[20] 4, 500, 000	300	4, 500, 300
Weldon, N. C.—				
Striped bass		1, 676, 000		1, 676, 000
Erwin Tenn.:				
Largemouth black bass			36, 000	36, 000
Brook trout			264, 700	264, 700
Rainbow trout			[21] 67, 303	67, 303
Rock bass			6, 455	6, 455
Sunfish			24, 056	24, 056
Fairport, Iowa:				
Largemouth black bass			56, 540	56, 540
Crappie			16, 250	16. 250
Smallmouth black bass			13, 805	13, 805
Sunfish			4, 660	4, 660
Fort Humphreys, Va.:				
Shad		29, 757, 000		29, 757, 000
Yellow perch		[22] 97, 452, 000	804	97, 452, 804
Dumfries, Va.—				
Largemouth black bass			1, 100	1, 100
Common pike			1, 500	1, 500
Yellow perch		14, 040, 000		14, 040, 000
Featherstone, Va.—				
Largemouth black bass			3, 500	3, 500
Sunfish			25, 000	25, 000
Lakeland, Md.—				
Largemouth black bass		187, 500	2, 265	189, 765
Crappie			275	275
Sunfish			65, 000	65, 000
Ogletown, Pa.—				
Brook trout			31, 000	31, 000
Gloucester, Mass.:				
Cod	354, 322, 000	272, 969, 000		627, 291, 000
Haddock	283, 544, 000	76, 242, 000		359, 786, 000
Pollock		14, 670, 000		14, 670, 000
Winter flounder		53, 085, 000		53, 085, 000
La Crosse, Wis.:				
Largemouth black bass			[23] 62, 965	62, 965
Brook trout			443, 270	443, 270
Buffalofish			15, 975	15, 975
Carp			2, 746, 000	2, 746, 000
Catfish			2, 010, 000	2, 010, 000
Crappie			[24] 799, 740	799, 740
Loch Leven trout			275, 900	275, 900

[13] In addition to 9,000 fingerling landlocked salmon turned over to the State of Maine in cooperative work.

[14] Turned over to the State of New Mexico in cooperative work.

[15] In addition to 16,000 fingerling largemouth black bass turned over to the State of New Mexico in cooperative work.

[16] In addition to 237,250 fingerling lake trout turned over to the State of Minnesota in cooperative work.

[17] In addition to 68,000 fry largemouth black bass turned over to the State of North Carolina in cooperative work.

[18] In addition to 64,200 fingerling largemouth black bass turned over to the State of North Carolina in cooperative work.

[19] In addition to 100 fingerling sunfish turned over to the State of North Carolina in cooperative work.

[20] In addition to 400,000 fry yellow perch turned over to the State of North Carolina in cooperative work.

[21] In addition to 15,000 fingerling rainbow trout turned over to the State of Georgia in cooperative work.

[22] In addition to 79,300,000 fry yellow perch turned over to the State of Virginia in cooperative work.

[23] In addition to 1,500 fingerling largemouth black bass turned over to the State of Wisconsin in cooperative work.

[24] In addition to 7,000 fingerling crappie turned over to the State of Wisconsin in cooperative work.

Stations and substations operated and the output of each, fiscal year 1932—Contd.

[Asterisk (*) denotes transfer of eggs. See table, p. 542]

Stations, substations, and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
La Crosse, Wis.—Continued.				
Pike and pickerel			10, 625	10, 625
Rainbow trout			253, 200	253, 200
Sunfish			[25] 940, 075	940, 075
White bass			900	900
Yellow perch			16, 590	16, 590
Miscellaneous fishes			250, 700	250, 700
Bellevue, Iowa—				
Largemouth black bass			8, 365	8, 365
Buffalofish		164, 150, 000	204, 300	164, 354, 300
Carp		114, 000, 000	8, 609, 000	122, 009, 000
Catfish			53, 200	53, 200
Crappie			45, 400	45, 400
Fresh-water drum			120	120
Pike and pickerel			80	80
Sunfish			588, 200	588, 200
White bass			12, 860	12, 860
Yellow perch			60	60
Miscellaneous fishes			257, 300	257, 300
Guttenburg, Iowa—				
Buffalofish	17, 850, 000			17, 850, 000
Carp	28, 000, 000			28, 000, 000
Harpers Ferry, Iowa—				
Buffalofish	73, 255, 000			73, 255, 000
Carp	85, 000, 000			85, 000, 000
Homer, Minn.—				
Largemouth black bass			143, 815	143, 815
Buffalofish			24, 655	24, 655
Carp			3, 423, 100	3, 423, 100
Catfish			3, 329, 450	3, 329, 450
Crappie			3, 690, 200	3. 690, 200
Fresh-water drum			525, 230	525, 230
Pike and pickerel			11, 770	11, 770
Sunfish			4, 374, 000	4, 374, 000
White bass			1, 805	1, 805
Yellow perch			211, 180	211, 180
Miscellaneous fishes			2, 276, 345	2, 276, 345
Lynxville, Wis.—				
Largemouth black bass			[26] 26, 840	26, 840
Buffalofish			134, 900	134, 900
Carp			2, 312, 500	2, 312, 500
Catfish			2, 311, 980	2, 311, 980
Crappie			[27] 937, 100	937, 100
Fresh-water drum			25	25
Pike and pickerel			28, 235	28, 235
Sunfish			[28] 1, 258, 500	1, 258, 500
White bass			1, 025	1, 025
Yellow perch			36, 150	36, 150
Miscellaneous fishes			121, 525	121, 525
Marquette, Iowa—				
Largemouth black bass			16, 082	16, 082
Buffalofish			221, 000	221, 000
Carp			2, 390, 000	2, 390, 000
Catfish			4, 355, 000	4, 355, 000
Crappie			1, 273, 000	1, 273, 000
Pike and pickerel			7, 775	7, 775
Sunfish			732, 000	732, 000
White bass			75	75
Yellow perch			8, 950	8, 950
Miscellaneous fishes			254, 700	254, 700
Leadville, Colo.:				
Black-spotted trout			296, 600	296, 600
Brook trout	* 1, 205, 000		3, 581, 000	4, 786, 000
Loch Leven trout			65, 000	65, 000
Rainbow trout			602, 350	602, 350
Creede, Colo.—				
Black-spotted trout	* 100,400		655, 120	755, 520
Brook trout	(*)		1, 289, 780	1, 289, 780
Loch Leven trout			258, 690	258, 690
Rainbow trout	* 50, 160		551, 750	601, 910

[25] In addition to 35,250 fingerling sunfish turned over to the State of Wisconsin in cooperative work.

[26] In addition to 650 fingerling largemouth black bass turned over to the State of Wisconsin in cooperative work.

[27] In addition to 7,870 fingerling crappie turned over to the State of Wisconsin in cooperative work.

[28] In addition to 106,005 fingerling sunfish turned over to the State of Wisconsin in cooperative work.

Stations and substations operated and the output of each, fiscal year 1932—Contd.

[Asterisk (*) denotes transfer of eggs. See table, p. 542]

Stations, substations, and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
Leadville, Colo.—Continued.				
Eagle Nest Lake, N. Mex.—				
Rainbow trout	* 820, 000		205, 000	1, 025, 000
Leetown, W. Va.:				
Brook trout			80, 100	80, 100
Loch Leven trout			100	100
Rainbow trout			50, 100	50, 100
Louisville, Ky.:				
Largemouth black bass		45, 000	12, 020	57, 020
Crappie			500	500
Rock bass			300	300
Smallmouth black bass		178, 000	[29] 5, 132	183, 132
Sunfish			2, 300	2, 300
Mammoth Spring, Ark.:				
Largemouth black bass			171, 470	171, 470
Rock bass			42, 500	42, 500
Smallmouth black bass			177, 350	177, 350
Sunfish			55, 500	55, 500
Lonoke, Ark. (in cooperation with State)—				
Largemouth black bass			15, 900	15, 900
Catfish			150	150
Crappie			400	400
Rock bass			2, 000	2, 000
Sunfish			2, 600	2, 600
Manchester, Iowa:				
Brook trout			[30] 806, 650	806, 650
Rainbow trout	* 235, 000		[31] 300, 000	535, 000
Rock bass			5, 000	5, 000
Smallmouth black bass			3, 200	3, 200
Nashua, N. H.:				
Atlantic salmon			[32] 5, 000	5, 000
Brook trout			358, 370	358, 370
Catfish			630	630
Landlocked salmon			[33] 15, 000	15, 000
Rainbow trout			24, 800	24, 800
Smallmouth black bass		150, 500	900	151, 400
Neosho, Mo.:				
Largemouth black bass			86, 533	86, 533
Catfish			1, 500	1, 500
Crappie			70, 750	70, 750
Loch Leven trout			1, 310	1, 310
Rainbow trout	(*)		[34] 165, 722	165, 722
Rock bass			2, 500	2, 500
Sunfish			45, 450	45, 450
Bourbon, Mo.—				
Rainbow trout	* 1, 820, 000			1, 820, 000
Langdon, Kans.—				
Largemouth black bass			87, 745	87, 745
Catfish			44, 710	44, 710
Crappie			25, 250	25, 250
Sunfish			57, 055	57, 055
Yellow perch			5, 220	5, 220
Tishomingo, Okla.—				
Largemouth black bass			5, 172	5, 172
Catfish			127	127
Crappie			7, 140	7, 140
Sunfish			161, 292	161, 292
Northville, Mich.:				
Brook trout			1, 251, 950	1, 251, 950
Loch Leven trout			87, 800	87, 800
Rainbow trout			84, 800	84, 000
Smallmouth black bass			11, 100	11, 100
Alpena, Mich.—				
Lake trout		487, 750		487, 750
Pike perch		[35] 26, 500, 000		26, 500, 000

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[29] In addition to 1,500 fingerling smallmouth black bass turned over to the State of Maryland in cooperative work.

[30] In addition to 9,600 fingerling brook trout turned over to the State of Iowa in cooperative work.

[31] In addition to 56,000 fingerling rainbow trout turned over to the State of Iowa in cooperative work.

[32] Turned over to the State of New Hampshire in cooperative work.

[33] Turned over to the State of New Hampshire in cooperative work.

[34] In addition to 9,546 fingerling rainbow trout turned over to the State of Kansas in cooperative work.

[35] In addition to 1,000,000 fry pike perch turned over to the State of Michigan in cooperative work.

Stations and substations operated and the output of each, fiscal year 1932—Contd.

[Asterisk (*) denotes transfer of eggs. See table, p. 542]

Stations, substations, and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
Northville, Mich.—Continued.				
Charlevoix, Mich.—				
Lake trout	725,000	[36] 16,091,000		16,816,000
Pike perch		10,300,000		10,300,000
Steelhead salmon			49,000	49,000
Whitefish	5,000,000	[37] 2,600,000		7,600,000
Orangeburg, S. C.:				
Largemouth black bass			217,782	217,782
Sunfish			98,217	98,217
Warmouth bass			5,915	5,915
Put in Bay, Ohio:				
Pike perch	114,050,000	171,500,000		285,550,000
Whitefish		61,000,000		61,000,000
Quinault, Wash.:				
Chinook salmon	6,000		24,600	30,600
Silver salmon	1,015,740	16,158,000		17,173,740
Sockeye salmon		9,458,000	2,053,735	11,511,735
St. Johnsbury, Vt.:				
Largemouth black bass			1,075	1,075
Brook trout		1,188,000	22,259	1,210,259
Landlocked salmon		10,000	14,841	24,841
Loch Leven trout			6,050	6,050
Steelhead salmon			27,275	27,275
Pittsford, Vt.—				
Black-spotted trout	(*)		2,530	2,530
Brook trout	(*)		67,196	67,196
Grayling	(*)		1,093	1,093
Rainbow trout	(*)		5,071	5,071
York Pond, N. H.—				
Brook trout		386,222	[38] 391,312	777,534
San Marcos, Tex.:				
Largemouth black bass		143,000	109,070	252,070
Catfish			850	850
Crappie			8,480	8,480
Rio Grande perch			16,300	16,300
Rock bass			400	400
Sunfish			37,825	37,825
Warmouth bass			200	200
Lake Worth, Tex.—				
Largemouth black bass		39,000	190,490	229,490
Crappie			8,575	8,575
Sunfish			114,305	114,305
Warmouth bass			900	900
Saratoga, Wyo.:				
Black-spotted trout			607,350	607,350
Brook trout			617,450	617,450
Loch Leven trout			139,600	139,600
Rainbow trout			342,100	342,100
Spearfish, S. Dak.:				
Brook trout			544,065	544,065
Loch Leven trout			455,450	455,450
Rainbow trout	* 134,610		92,708	227,318
Crawford, Nebr.—				
Largemouth black bass			10,300	10,300
Brook trout			140,000	140,000
Catfish			42,350	42,350
Loch Leven trout			143,000	143,000
Rainbow trout			133,260	133,260
Sunfish			3,000	3,000
Yellow perch			47,900	47,900
Springville, Utah:				
Black-spotted trout	* 346,000	[39] 379,000	[40] 748,275	1,473,275
Brook trout	(*)		241,000	241,000
Loch Leven trout			45,000	45,000
Rainbow trout	* 1,150,000		[41] 701,591	1,851,591
Tupelo, Miss.:				
Largemouth black bass		300,500	99,765	400,265
Sunfish			457,225	457,225
Aliceville, Ala.—				
Largemouth black bass			8,525	8,525
Sunfish			34,350	34,350

[36] In addition to 14,241,000 fry lake trout turned over to the State of Michigan in cooperative work.
[37] In addition to 1,000,000 fry whitefish turned over to the State of Michigan in cooperative work.
[38] In addition to 400 fingerling brook trout turned over to the State of New Hampshire in cooperative work.
[39] Turned over to the State of Nevada in cooperative work.
[40] In addition to 16,900 fingerling black-spotted trout turned over to the State of Utah in cooperative work.
[41] In addition to 4,700 fingerling rainbow trout turned over to the State of Utah in cooperative work.

Stations and substations operated and the output of each, fiscal year 1932—Contd.

[Asterisk (*) denotes transfer of eggs. See table, p. 542]

Stations, substations, and species	Eggs	Fry	Fingerlings, yearlings and adults	Total
White Sulphur Springs, W. Va.:				
Largemouth black bass			40,000	40,000
Brook trout	25,000		[42] 2,066,066	2,091,066
Loch Leven trout			232,200	232,200
Rainbow trout	350,600		[43] 672,740	1,023,340
Rock bass			8,106	8,106
Sunfish			45,000	45,000
Woods Hole, Mass.:				
Cod	14,495,000	71,239,000		85,734,000
Haddock	440,365,000			440,365,000
Mackerel		15,245,000		15,245,000
White perch			325	325
Winter flounder	81,965,000	680,657,000		762,632,000
Wytheville, Va.:				
Largemouth black bass		12,000	64,758	76,758
Brook trout			[44] 319,740	319,740
Catfish			[45] 4,436	4,436
Loch Leven trout			39,300	39,300
Rainbow trout	* 100,000		[46] 317,165	417,165
Rock bass			9,806	9,806
Smallmouth black bass			1,029	1,029
Sunfish			83,292	83,292
Yellowstone Park, Wyo.:				
Black-spotted trout	* 7,337,000		3,146,000	10,483,000
Grayling		40,000		40,000
Yes Bay, Alaska:				
Brook trout			77,050	77,050
Humpback salmon		317,000		317,000
Sockeye salmon	3,144,960			3,144,960

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[42] In addition to 874,200 fingerling brook trout turned over to the State of West Virginia and 5,000 turned over to the State of Virginia in cooperative work.

[43] In addition to 1,400 fingerling rainbow trout turned over to the State of Kentucky and 229,015 turned over to the State of West Virginia in cooperative work.

[44] In addition to 89,900 fingerling brook trout turned over to the State of Virginia and 6,350 turned over to the State of West Virginia in cooperative work.

[45] In addition to 750 fingerling catfish turned over to the State of West Virginia in cooperative work.

[46] In addition to 10,100 fingerling rainbow trout turned over to the State of Virginia and 4,125 turned over to the State of West Virginia in cooperative work.

EGG COLLECTIONS

The collection of eggs, both from station brood stock and from wild fish, including those taken as a by-product of the commercial fisheries, shows a decline of over a billion as compared with the collections of the previous year. The greater part of this drop is due to a sharp curtailment in the take of winter flounder eggs, the collections of that species being less than in 1931 to the extent of over 900,000,000. Scattering declines will also be noted in the egg collections of whitefish, cisco, all species of Pacific salmon except the sockeye, rainbow trout, black-spotted trout and lake trout, and in other minor groups. It is noteworthy that notwithstanding this rather marked decline in egg collections the drop in output or actual production of fish was considerably less than proportional, indicating a higher percentage of results in hatching and rearing.

Comparison of egg collections, fiscal years 1932 and 1931

Species	1932	1931
Buffalofish		103, 162, 000
White sucker	17, 275, 000	7, 375, 000
Carp		113, 250, 000
Shad	37, 342, 000	19, 122, 000
Glut herring	117, 220, 000	104, 715, 000
Whitefish	133, 215, 000	359, 122, 000
Cisco	35, 200, 000	92, 520, 000
Chinook salmon	73, 432, 400	64, 770, 500
Chum salmon	20, 035, 000	19, 560, 000
Humpback salmon	8, 432, 000	20, 726, 670
Silver salmon	8, 168, 300	9, 333, 500
Sockeye salmon	69, 123, 220	54, 999, 270
Steelhead salmon	2, 791, 000	3, 670, 430
Landlocked salmon	994, 980	1, 241, 720
Rainbow trout	18, 807, 710	22, 327, 230
Black-spotted trout	11, 484, 300	25, 417, 000
Loch Leven trout	21, 674, 200	20, 502, 700
Lake trout	43, 982, 930	68, 649, 800
Brook trout	24, 115, 810	13, 005, 150
Dolly Varden trout	2, 731, 420	
Grayling	768, 000	1, 000, 000
Pike perch	717, 393, 190	564, 240, 000
Yellow perch	178, 080, 000	131, 640, 000
Striped bass	2, 095, 000	13, 370, 000
White perch	13, 700, 000	
Cod	1, 715, 437, 000	1, 632, 253, 000
Haddock	820, 894, 000	421, 524, 000
Pollock	21, 212, 000	388, 130, 000
Winter flounder	3, 398, 941, 000	4, 333, 487, 000
Mackerel	16, 782, 000	12, 050, 000
Total	7, 531, 227, 460	8, 621, 163, 970

NOTES ON OPERATIONS

COMMERCIAL SPECIES

Pacific salmons.—In the Pacific coast field, including Alaska, the main activity is the propagation of salmon, with the object of maintaining the important industry dependent upon the fisheries for these species. In connection with this work during 1932 there was a moderate decrease in the output of all the Pacific salmons with the exception of the chum and the steelhead salmons. In certain areas, however, particularly in California, where hatcheries are operated at Baird and near-by substations, and on the Columbia River, capacity collections of eggs were made, and a considerable portion of the run was allowed to spawn naturally, due to insufficient room to care for the eggs. In the Puget Sound field, where five stations are operated, one of the most striking features was the damage caused by floods during the early spring. In the Columbia River area salmon flesh to the extent of more than 14 tons was frozen and held in cold storage for the purpose of feeding it to the millions of fish held for rearing to fingerling size. It was reported that at the Yes Bay (Alaska) station one of the best runs of sockeye salmon noted in years was in evidence.

Various major improvements were made at a number of points, including a complete rehabilitation of the water supply system for the Clackamas (Oreg.) station, which comprised a new pump and replacement of the water-supply line. Over a half-mile length of new water-supply line was also installed at the Little White Salmon (Wash.) substation. Salmon propagation at the Snake River (Idaho) substation gave unsatisfactory results but a considerable degree of success attended the handling of rainbow trout. A discussion of the construction of a new hatchery at Butte Falls, Oreg., appears elsewhere. Extensive marking experiments, for the purpose of securing data on the migration of sockeye salmon, were conducted by the superintendent of the Birdsview (Wash.) station. A new highway, permitting access by means other than the pack-horse method to the Baker Lake (Wash.) station, was under construction by the United States Bureau of Public Roads. Close observation of the run of salmon in Baker River, so seriously affected by the large power dam at Concrete, Wash., was maintained during the year and revealed a run somewhat larger than that of the previous year. It is becoming increasingly evident, however, that this structure is having a most injurious effect upon an important fishery resource.

Great Lakes species.—Output figures show a decline from last year in all of the commercial species of the Great Lakes with the exception of pike perch. Whitefish and cisco were produced in numbers materially less than in the previous year. The unusually prolonged period of warm weather prevailing during the late fall and early winter had a noticeable effect on the collections of whitefish and lake trout eggs, and it resulted in a somewhat poor quality of eggs taken during the early part of the season.

The work with the commercial species was quite heavily curtailed in the New York field. Only negligible quantities of whitefish and lake trout eggs were secured from Lake Ontario for stocking the Cape Vincent hatchery, and the cisco (lake herring) egg collections were sharply reduced from the average production. Extensive subsidiary activities connected with the propagation of game fish were in progress at the Cape Vincent station, however. This work comprises the operation of smallmouth bass ponds and the results of the year's work were very successful, almost 300,000 fingerlings and advanced fry being produced and distributed. The artificial cultivation of daphnia, a live food for the young bass, has been developed at this station to a high degree of practical efficiency. The Cape Vincent station also maintains substations for the rearing of trout at Barneveld, Cortland, and Watertown, N. Y., and from these points approximately 1,000,000 trout of four species were distributed in the course of the year. The substation at Swanton, Vt., maintained cooperatively by the States of Pennsylvania and Vermont and the Bureau of Fisheries, is administered by the Cape Vincent station for the propagation of pike perch. During the early part of the spawning season weather and other conditions indicated that the output of pike perch would be limited. Toward the close of the season, however, a large number of fish appeared on the spawning grounds and egg collections were increased to a very satisfactory degree.

Throughout the entire Great Lakes area there was a phenomenal run of pike perch during the spawning season, with the result that all of the bureau's Michigan hatcheries and the hatchery at Put-in Bay, Ohio, were filled to capacity with eggs, as were also the State hatcheries within this area. Furthermore, the eggs were of good quality and an excellent percentage of hatch was attained. The closure of Isle Royale (Mich.) waters to commercial fishing materially reduced the collection of lake trout and whitefish eggs in the Minnesota field, and approximately 8,000,000 lake trout and less than 1,000,000 whitefish constituted the year's output of these species from the Duluth hatchery. Pike perch eggs, collected in cooperation with the State of Minnesota, were also incubated at the Duluth station. In the Michigan field the handling of eggs of the commercial species was on a limited scale at the Alpena substation. On the other hand, quite satisfactory egg collections were obtained for the Charlevoix hatchery, though the quality of some of them was below normal, thus curtailing the year's output. Operations at the main station at Northville, Mich., were confined to the propagation of game fishes, including the trouts and the smallmouth bass. This work was conducted on the usual basis with a normal output, notwithstanding the fact that the trout rearing operations were somewhat complicated by an outbreak of disease. The two large cooperative trout nurseries supervised by the Northville station yielded satisfactory results.

Marine species.—From a numerical standpoint the three marine stations in New England handled more eggs and fish by far than the remainder of the bureau's hatcheries combined. An outstanding feature of the year's work was the unfavorable season for pollock propagation at the Gloucester (Mass.) station. The prevailing low market prices discouraged fishing and prevented satisfactory egg collections. The cod output in this field was somewhat below normal, but a very successful season was experienced in the propagation of haddock. It is the practice at Gloucester station to detail spawn-takers to the commercial fishing vessels operating in the offshore waters for the purpose of fertilizing eggs of the cod and haddock and planting them on the fishing grounds of the region. During the season over 130,000,000 eggs of these species were thus salvaged. The attempts made to handle flatfish or flounder at Gloucester failed to produce average results, due to the destruction of fishing gear by storms.

At the Boothbay Harbor (Me.) station an extensive program of overhauling and renovating the plant, including residences, docks, etc., was carried on throughout the year. The output of flat fish was lower than that of the previous year, due to the smaller average egg yield, which amounted to 181,000 per fish in comparison with an average of 250,000 in previous years. The same conditions which curtailed pollock operations at Gloucester restricted the output of the Boothbay Harbor hatchery, the prevailing low prices discouraging fishing and making it difficult to obtain eggs in satisfactory numbers.

The propagation of cod, winter flounder, and mackerel is only one of the numerous activities carried on at the Woods Hole (Mass.) station. The station personnel is responsible for the upkeep of the extensive structures and equipment needed for scientific investigations and the fish-cultural work. During the year a new concrete floor was installed in the hatching room, replacing an old wooden floor in bad condition. Considerable work was also required in connection with the upkeep of the station residences and water supply system. The output of cod closely approximated the average production over a period of years. A satisfactory season was experienced in the propagation of winter flounder and nearly 17,000,000 mackerel eggs were secured from local traps and incubated. In connection with flounder propagation over 1,000 adult fish were marked or tagged for scientific purposes before being released.

Commercial anadromous species of the Atlantic coast.—Several of the Atlantic coast stations propagate commercial anadromous forms in addition to the cultivation of other species of fish. These stations are located at East Orland, Me., Edenton, N. C., Fort Humphreys, Va., and Orangeburg, S. C. The station at East Orland, Me., receives annually an allotment of Atlantic salmon eggs from the Canadian Government, the quantity varying with the supply available in Canada and the number of trout eggs which can be furnished from the bureau's hatcheries in exchange. During the past year the station received a million eggs and allotted approximately half of them to the State hatcheries in Maine. Normal success was attained in the incubation of the eggs and the distribution of the resulting fry. It is reported that while the run of salmon in the Penobscot River was not as large as in the previous year, an improvement over conditions existing in recent years was evident and the fish taken were of excellent size. The imposition of restrictions on commercial fishing for this species, together with continued distributions of fingerling salmon by the State of Maine and the bureau should result in a decided improvement in the status of this desirable commercial and sport fish.

Adverse weather conditions at the Edenton station restricted the collection of yellow perch breeders and curtailed the output of that species to 4,500,000 fry. Though satisfactory catches of shad were reported by fishermen in the lower portions of Albemarle Sound, no shad propagation whatever was possible at Edenton, owing to an entire absence of mature roe shad on the spawning grounds accessible to the station in its upper reaches. The Fort Humphreys station, which comprises the principal shad hatching unit in the United States at the present time, reported an average season in the propagation of yellow perch and a distribution of 29,000,000 shad fry, this number exceeding somewhat the shad production of the previous year. In cooperation with the State of South Carolina, the Orangeburg station, primarily a pond-fish plant, conducted shad propagation at two temporary field hatcheries at Jacksonboro and Yemassee, S. C. The output of slightly less than 3,000,000 fry was practically the same as the results of the previous year's work in these fields.

ROCKY MOUNTAIN GAME FISH PROPAGATION

Notwithstanding the vast area, the comparatively sparse population, and the extensive stream mileage, the fish-hatchery work in the Rocky Mountain section, both Federal and State, is proving a very important factor in maintaining this part of the country as one of the outstanding trout-angling territories on the North American continent. The importance of the Federal fish-cultural work is intensified by the tremendous acreage of the public domain, which includes national forests, national parks, Indian reservations, and reclamation districts, all of them depending heavily upon strictly Federal hatcheries for the maintenance of the fish supply in their waters. In addition to producing large numbers of fry, fingerling, and larger trout for stocking Rocky Mountain areas, collections of eggs from wild trout yield a surplus available for transfer to State and Federal hatcheries in other sections of the United States, where the production of domesticated eggs is impracticable and their purchase expensive. The Meadow Creek substation, operated as an auxiliary of the Bozeman (Mont.) station, is located in one of the most productive fields in this district. At this point collections of Loch Leven trout eggs in excess of 15,000,000 are available annually for maintaining the local supply and for shipment on an extensive scale to other parts of the country. The main station at Bozeman experienced a highly successful year, producing an output requiring 25 trips of the bureau's railroad cars to distribute, in addition to 12 loads carried by tank trucks. Operations at the Miles City (Mont.) substation, constituting the largest pond fish cultural unit in the Northwest, are directed jointly by the Bozeman station and the Montana Fish and Game Commission. During 1932 this unit produced over 600,000 pond fish, including black bass, crappie, sunfish, catfish, and minor species. Its efficiency was materially increased by the construction of a new water supply ditch 1¼ miles in length.

Included for administrative reasons within the Rocky Mountain group is the Crawford (Nebr.) unit, which is gradually expanding its production of pond fish by the establishment of ponds on the Fort Robinson Military Reservation. The Spearfish (S. Dak.) hatchery, which serves the Black Hills region, is now concentrating on the production of larger sized fish in preference to increased numbers. The work at that point was hampered by the virtual disappearance of the hatchery spring water supply during the early spring. By resorting to various expedients the crop of fish was cared for and on resumption of the normal flow it became evident that the season's output would not be seriously affected.

Second only to the Bozeman station is the Leadville (Colo.) hatchery with its two auxiliaries at Creede and Crystal Lake, near Leadville, the last named now being in course of establishment. The constructions to date have consisted of a dwelling, service buildings, and a water-supply system, preparatory to the installation of rearing ponds. A lake on the property has been stocked with 75,000 brook trout fingerlings. The main station at Leadville made its usual field collections of brook and rainbow trout eggs, amounting close to 8,500,000. The efficiency of the Creede substation has been materially increased by the provision of a new water supply adequate for the full capacity of the hatchery.

Rainbow-trout operations at the Saratoga (Wyo.) station were hampered by the recent draining of the Pathfinder Reservoir, which in the past has yielded millions of eggs of this species. Satisfactory egg collections were secured for the Springville (Utah) station but severe epidemics occurring during the fry stages of the resulting fish caused a very heavy mortality among all species of trout on hand. An investigation traced these losses to a bacterial infection, which arose apparently from the unprotected water supply. Various expedients, including improvement of the spring source and the use of city water, are being planned for in an effort to avert this difficulty in future. The Springville station has now built up a sufficient stock of brood rainbow trout to enable it to ship a number of eggs to other points. As the season for the propagation of black-spotted trout in the Yellowstone Park extends through June into the late summer, a report on the year's operations must necessarily include only part of the work performed during any given season. Egg collections in this field during the spring of 1932 amounted to 17,500,000, exceeding the take of the two previous years. Experimental lots of grayling eggs were handled also. An extensive series of rearing pools in course of construction at the Mammoth Hot Springs auxiliary was completed and placed in operation during the fish-cultural season. With the completion of the residences now undergoing construction the Yellowstone Park unit will be one of the most adequate and complete of the bureau's hatcheries.

The establishment of the new pond fish cultural station at Dexter, N. Mex., was started on October 7, 1931, and by the end of the fiscal year the work had been carried to a point making possible a distribution of over 50,000 bass, with a large number of fingerlings remaining in the ponds for later shipment. Three residences, a garage and shop building, an office building, and a pump house were erected; and a pond area comprising almost 100 acres was completed and placed in service, making this station one of the largest bass and pond fish plants operated by the bureau. The rapidity with which this station was placed on a productive basis is noteworthy, and it was particularly needed for the propagation of warm water fish for stocking an extensive area throughout the Southwest which is not suitable for trout.

In addition to the strictly fish-cultural work conducted in Rocky Mountain territory investigations previously undertaken in connection with a biological study of the national parks and national forests were continued. As a result of these inquiries reports were rendered as a basis for a stocking policy on 15 separate national forests in Colorado, Wyoming, and Utah, and on the Rocky Mountain National Park. Biological surveys of a more scientific character were made by field parties of the waters of Teton National Park and the Wasatch National Forest, in Utah, and near the close of the fiscal year a party of investigators had entered Glacier National Park to resume studies previously instituted along the same lines. It is interesting to note in this connection that the Wasatch National Forest has been designated by the Forest Service as an experimental field for fish-cultural work. Further recognition of the biological character of the work of the bureau's Salt Lake City staff is evidenced by the invitation extended to the bureau's district supervisor by the University of Utah to establish his office headquarters on space allotted by the university.

The staff of regional investigators and fish-culturists devoted some time during the year to a study of fish diseases and feeding experiments, principally at the Springville station. At Bear Lake, Utah, a tract of land has been donated for use as an auxiliary trout-rearing station and plans for its development were being considered at the close of the year. A similar auxiliary on a smaller scale has been installed for Teton National Park, and a survey has been made of a tract of Government-owned land known as Powell Slough, which has been made available for bass and other pond fish rearing operations. Certain difficulties as to title have delayed the inception of actual construction on this site. The greater part of the activities outside of routine fish-cultural operations at the older hatcheries has been developed within the past two years, since regional headquarters were instituted at Salt Lake City. The wisdom of establishing this new administrative unit has been well demonstrated by the advances made and the interest displayed by State fish and game authorities and sportsmen generally throughout the intermountain region.

GAME FISH PROPAGATION IN NEW ENGLAND

The work of the hatcheries in New England is confined mainly to the propagation of trout, though at several of them a few pond fish are produced. As a whole the year's operations at this group were quite successful. The Hartsville (Mass.) station increased its formerly inadequate water supply by digging wells and installing a pump. In addition to fish-cultural work on the usual scale, conditions at the Nashua (N. H.) station were improved by the construction of 1,500 feet of new fencing. In cooperation with the Connecticut fisheries authorities, this station also secured 120,000 smallmouth bass fry in certain reservoirs in that State where fishing is prohibited and utilized them in stocking other waters. This collection was greatly in excess of any that has been available for New England waters in recent years.

Activities in general at the Pittsford (Vt.) experimental hatchery were continued along formerly established lines. Feeding experiments and selective breeding experiments, carried on under the direction of the division of scientific inquiry, constituted the basic activity, and as a result of such work brook trout eggs and fingerlings in considerable quantity were made available for distribution and for transfer to other stations. A noteworthy item was the taking and hatching of eggs from Montana grayling which had been reared from the egg stage at the Pittsford station. In view of the difficulty heretofore experienced in handling grayling, this is considered to be a notable achievement in fish culture. It is also pertinent to point out that as a result of selective breeding, the average number of eggs per fish taken from selected brook trout breeders has been increased from 958 to 1,606 within a period of three years. A virtual reconstruction of the Pittsford hatchery building became necessary during the year, in order to prevent serious depreciation, and the general improvements included the extension of the pond rearing system.

The two largest establishments in the New England area are the one at East Orland, Me., and the St. Johnsbury (Vt.) station, with its important auxiliary at York Pond, N. H. At the last-named point the development work in progress under a special appropriation is nearing completion. The more important constructions include a new cement block hatchery and a stable and garage building. The water-supply system was also improved and additional rearing facilities installed. At this substation, which is the main producing unit for brook trout eggs to meet the bureau's requirements throughout the country, the egg collections exceeded those of any previous year. The former practice of securing the eggs from wild fish taken in closed streams within the national forest areas has been abandoned and dependence is now placed on domesticated stock maintained under seminatural conditions. At the St. Johnsbury station routine fish-cultural work was prosecuted with average results.

In addition to its work with the Atlantic salmon, a discussion of which appears elsewhere, the station at East Orland, Me., collected nearly 3,750,000 brook trout eggs, shipped over 2,000,000 in the eyed stage to other stations, and produced and distributed a large output of fingerling trout. A constant effort is being made to expand the facilities of the station and improve the property, and the various minor changes made during the year were effected with that aim in mind. Under the supervision of the East Orland station the auxiliary at Grand Lake Stream, Me., concentrated, as heretofore, on the collection of landlocked salmon eggs. Almost a million were taken, slightly below the record of the previous year. A considerable number of the fish resulting from these eggs are held in rearing ponds, for distribution as fingerlings 2 inches or more in length. In addition to work with the landlocked salmon, a considerable number of brook trout and a few Atlantic salmon were handled at this point.

GAME FISH PROPAGATION AT COMBINATION TROUT AND POND FISH STATIONS

Located in the Middle West and southeastern sections of the country, where water conditions favor the existence of both cold and warm water fishes, are the several stations devoted to the culture of both trout and the pond fishes. The propagation of trout is the more important feature, however, at most of these establishments.

At the Wytheville (Va.) station, one of the oldest in the service, a very important feature of the year's work was the development of auxiliary rearing plants on leased property and the transfer of fish thereto from the main hatchery for rearing. At two of these, one within 3 miles of the station and the other at Newcastle, Va., facilities for such work were improved by the erection of necessary buildings and the provision of additional pond space. The White Sulphur Springs (W. Va.) station handled over 5,000,000 trout eggs during the year, which, in view of its comparatively limited size, is considered an excellent record. The same cooperative relations that have existed in the past were maintained with the State of West Virginia. Under this arrangement the State purchased 1,000,000 brook trout eggs which were incubated at the bureau's hatchery and the resulting fry were turned over to be handled by the State. The propagation of warm water pond fish at this station, including bass, bream, and a limited number of rock bass, gave somewhat more successful results than in previous years. Considerable attention was given to maintaining the appearance of buildings and grounds, since this hatchery is located at a point where it is subject to inspection by numerous visitors.

Work at the Erwin (Tenn.) station was conducted along the usual lines, though rainbow trout propagation was curtailed somewhat by a reduced brood stock, as a result of unusual mortality and the culling of the older fish. A satisfactory output of both trout and pond fish was secured at Manchester, Iowa, with no striking deviations from hitherto established records. After prolonged and intensive effort this station has succeeded in eradicating furunculosis, a disease which has been taking a heavy toll of the rainbow brood stock. The Neosho (Mo.) station administers substations at Bourbon, Mo., Langdon, Kans., Tishomingo, Okla., and Natchitoches, La. The former is a cooperative establishment conducted for the sole purpose of securing rainbow trout eggs, while the three latter are pond-fish stations. In all respects the results at Neosho were equal to the records of previous years. While the work at Bourbon was interfered with by a water shortage, it was possible to exceed the egg collections of any previous year at this point to the extent of 300,000. The shortage of water was reflected in the incidence of parasitic affection. Reference to activities of substations propagating pond fish exclusively appears elsewhere.

POND-FISH STATIONS

The output of stations in the Southern States engaged in the propagation of the so-called warm water pond fishes is devoted to the stocking of comparatively small bodies of water, many of them ranging down to a half acre in area. Since there is a multitude of such ponds in many sections of the country, the demand for bass, sunfish, crappie, etc., is extremely heavy and great difficulty is experienced by the bureau in keeping abreast of the work of filling applications for these species. A review of the year's operations makes evident the fact that the output was seriously affected by unusually severe weather conditions. Storms and unseasonably low temperatures resulted in the loss of numerous nests of eggs during early March and retarded spawning over the entire territory covered by the pond-fish hatcheries. Notwithstanding this handicap, the results obtained from later spawning were very satisfactory. The Tupelo (Miss.) station has continued to operate on a highly successful scale and during the past year it produced and distributed, in seven different States, close to 900,000 bass and sunfish. The recently established Dexter (N. Mex.) station has already proved of inestimable value in supplying bass to a territory which has in the past been difficult and expensive to reach. With an available total of only about 2,000 brood fish of all species the station produced and distributed well over 50,000 young bass, and at the close of June the ponds still contained many fingerling bass, in addition to large numbers of crappie, catfish, warmouth bass, and bream.

The Warm Spring (Ga.) station established a new high record, its output of fish for the year exceeding 1,000,000, over half of which were bass fingerlings. The prolonged period of extremely dry weather prevailing in the Valdosta (Ga.) field reduced the station water supply to a point where only a negligible production of fish was possible. This difficulty will continue to handicap the Valdosta work until funds for completing the station in accordance with the original plans are made available, these plans including the provision of an adequate water supply, obtainable in the immediate vicinity. In addition to its work with the anadromous species, which is discussed elsewhere, the Edenton (N. C.) station propagated and distributed almost 500,000 fingerling bass. This record was made possible largely by giving increased attention to the fertilization of the limited pond area available for the work. At the Louisville (Ky.) station, where the principal activity is the propagation of smallmouth black bass, various conditions, including unfavorable weather and an inadequate supply of brood fish, curtailed the year's output to a point considerably below the normal annual production in that field. Although this station also has a very limited pond area, experience has shown that it will be necessary in the future to rear its own brood stock in preference to depending upon collections obtained from outside sources.

The Mammoth Spring (Ark.) station, which concentrates on the propagation of both largemouth and smallmouth bass, reported the most successful output of both species produced in this field in recent years. The superintendent continued to cooperate with the Arkansas State authorities, and by the reciprocal filling of requests for fish it has been possible to avoid an accumulation of unfilled applications. The Orangeburg (S. C.) station has been working on an enlargement and development plan, authorized under the terms of the 5-year building program. This has included the construction of a concrete-lined ditch over 1,500 feet long for the diversion of surface water, and the construction of an additional pond approximating three-fourths of an acre in area. It is noteworthy that this pond yielded in excess of 100,000 bass fry and fingerlings during the spring of 1932, and several schools containing more than 8,000 fingerlings were taken. Enlargement and improvement of the station pond system is to be continued. In addition to the propagation of shad, which was carried on in conjunction with the State of South Carolina, the Orangeburg station experimented in the use of abandoned rice fields for the rearing of bass fry. Though many difficulties were encountered in this undertaking, the results of the season's efforts were fairly satisfactory.

Average success was attained in the fish-cultural work at the San Marcos (Tex.) station and its auxiliaries at Fort Worth and New Braunfels, Tex. The brood bream on hand were attacked by a sudden epidemic, however, and all of them died within a space of 48 hours. Attempts made to renew the brood stock by the introduction of fish from other points also resulted in a total mortality. The nature and cause of this epidemic have not as yet been ascertained. A large pond, constructed by erecting a dam in a slough of the San Marcos River, has not been a success, due to the fact that backwater conditions produced stagnation, resulting in the loss of some of the brood fish. In addition to its fish-cultural work the Fort Worth substation is being used by the division of scientific inquiry as a base for the experimental culture of mussels. A number of tanks for the development of daphnia were installed there during the year. The new substation at Natchitoches, La., had been practically completed by the close of the year and efforts were being made to collect an adequate brood stock. At Tishomingo, Okla., gradually increased production has been achieved from the improvements carried on at this comparatively new station during the past year. The Fairport (Iowa) biological station, the center of investigation of pond fish cultural methods, yielded a considerable number of fish, amounting to four carloads. The majority of these were bass.

RESCUE OPERATIONS AND UPPER MISSISSIPPI WILD LIFE REFUGE

Administration of the Upper Mississippi Wild Life Refuge and the bureau's Mississippi River salvage operations overlap, since a considerable proportion of the area covered by the river crews falls within the boundaries of the refuge. The bureau's work in that territory is centered at La Crosse, Wis., and field operations are carried on during the rescue season from Homer, Minn., and several other points. Due to a protracted water shortage, resulting from a continuation of the drought of the previous year, there was a sharp drop in the season's collections, the total of the 16 or more species handled amounting to 51,611,367, representing less than half the results of an average season. All of these fish were returned to parental waters with the exception of 191,460, which were utilized in the general distribution work. The greater part of the collections were made in fields contiguous to the Homer substation. The cost of the season's work amounted to 27⅒ cents per thousand fish handled.

The rescue work is supplemented by the propagation of fish in semicontrolled ponds adjacent to some of the substations, and a large rearing pond adjoining the La Crosse station is also utilized. Three ponds over which full control is exercised by the bureau are now in use and there are six others within the boundaries of the refuge which may be operated in favorable seasons under the same conditions as ordinary hatchery ponds. In addition to its other activities the La Crosse station does an important work in trout propagation. It is the chief source for trout for stocking waters in Minnesota and Wisconsin, and during the fiscal year 1932 it produced nearly a million brook, rainbow, and Loch Leven trout for distribution in those States, a considerable proportion being assigned for cooperative nursery work. These cooperative establishments, numbering 42 in Wisconsin and 12 in Minnesota, required a considerable amount of attention from the La Crosse personnel in their supervision and guidance. An effort is being made to extend this cooperative work to include the rearing of bass and other warm-water fishes.

With regard to operations pertaining strictly to the Upper Mississippi Wild Life and Fish Refuge, the first half of the fiscal year, comprising the summer and fall of 1931, covered the final activities of the division of scientific inquiry in making biological investigations in that area. The principal accomplishments were (1) continuation of a scientific investigation of slough bottoms, (2) the chemical control of weeds, (3) seminatural propagation of fish in selected slough areas. After an inspection in the fall of 1931 it was decided that this particular phase of the work had reached its maximum usefulness, and that main attention thereafter should be given to propagation activities. During a high stage of the river in the spring of 1932 many of the sloughs which had been the scene of previous experiments were flooded, illustrating the wisdom of discontinuing that phase of the work. The funds made available by this change were utilized for the development of rearing ponds in many favorable places, and by such means additional pond space to the extent of over 30 acres was made available for the work. Even in these comparatively high elevations the operations were hampered by high-water stages during the spring.

FISH-CULTURAL NOTES

POND-CLEANING PUMPS

The division of fish culture is conducting experiments for the purpose of developing a satisfactory pond-cleaning pump for the removal by suction of loose débris and filth from trout ponds and raceways. There are on the market a number of so-called trash pumps and portable, gasoline-operated, centrifugal pumps which are designed to pass solid material of fairly large dimensions. Fish-cultural agencies have for a number of years been giving thought to equipment of this kind, really applying the vacuum-cleaner principle in water. While the equipment tried out by the bureau thus far has not been fully satisfactory, the results of the experiments have been sufficiently encouraging to warrant further study of the problem in cooperation with pump manufacturers.

SPECIAL DISTRIBUTION TRUCKS

For over a year the bureau has operated several units of the special type of oxygen tank distribution trucks. These are now manufactured and sold as complete units, and are used by a number of the States and by various private fish culturists. The bureau's experience with such equipment, on the Pacific coast and elsewhere, leads to the conclusion that under certain conditions it will meet distribution requirements and render efficient service.

EFFECT OF WEATHER ON SOUTHERN POND STATIONS

During the early part of March a period of exceedingly severe weather was experienced over the greater part of the United States. The effect of these storms and unseasonably low temperatures was reflected in the reports from the bureau's southern pond stations, the majority of them recording the loss of all bass spawn which had been deposited. It is especially noteworthy that stations located at widely separated points were subjected to the same weather conditions.

REARING OF GRAYLING

The Pittsford (Vt.) experimental station is now rearing a second generation of domesticated grayling. Heretofore it has been the commonly accepted opinion among fish culturists that it was not practicable or hardly possible to rear grayling even to the fingerling stage. However, the lot of fish referred to was successfully brought to maturity under artificial conditions at the Pittsford station, and eggs in considerable numbers were taken from them and hatched. The resulting fry are now being reared with the same measure of success that attended the hatching of the parent fish.

ERADICATION OF FURUNCULOSIS

When a trout hatchery has become infected with the furunculosis disease it has been the practice in too many cases to accept the difficulty as one which can not be surmounted, and to trust to luck that it will either die out naturally or that its ravages will prove sporadic. Recent experience at two of the bureau's stations has shown that it is quite practicable by the adoption of rigorous measures to eliminate all traces of the disease. Several years ago at the Barneveld (N. Y.) substation and during the past year at the Manchester (Iowa) station a program of pond disinfection and other measures appears to have eliminated the infection as an active factor in fish-cultural work. The experience at these stations indicates the necessity for the adoption of heroic treatment, accompanied by a willingness to sacrifice infected fish, equipment, and material. In other words, the entire plant must undergo a complete overhauling from the water supply source throughout the entire system of ponds, troughs, and other equipment used.

NEW FORM OF POND CONSTRUCTION

Circular trout ponds of a new type are being constructed in connection with the development of several of the new stations, and as circumstances and funds permit ponds of the same design will be installed at the bureau's older stations. All reports received on this form of construction from States and other agencies who have tested it indicate that it has a high value, and the limited experience the bureau has had with it confirms this viewpoint. The new ponds are merely saucer-shaped pools with the outlet at the center and the water supply entering at a tangent, to give a rotary circulation. It is claimed that ponds of this design are capable of carrying increased numbers of trout in a comparatively small water supply and that the fish in them are more evenly distributed than in ponds of the older types.

TAGGING OF BASS

While the tagging of trout has been practiced quite extensively by some of the States, by private clubs, and by the bureau, operations of this nature with bass have been rather rare. Recent conditions at the Cape Vincent (N. Y.) station have afforded an unusual opportunity for such work with the smallmouth bass. Brood bass for the ponds at that station are obtained from the St. Lawrence River, under a permit issued by the State of New York. In accordance with the terms of this permit the fish are returned to the river after spawning is over, and prior to their release they are tagged with gill cover tags, with the view of checking up on their recapture by anglers. The information gained as a result of two years' tagging operations indicates that there is very little migration on the part of smallmouth bass, the maximum distance covered being from 12 to 15 miles.

USE OF NICKEL MESH FOR HATCHING MARINE EGGS

A very satisfactory report has been received from the Woods Hole (Mass.) station on the use of nickel hardware cloth as a covering for the bottoms of trays used in the tidal hatching boxes. This material shows a high resistance to salt-water corrosion, no evidence of deterioration being discernible after a full season's use, though the metal tacks used in attaching it were seriously corroded. The substitution of nickel fastenings should overcome this difficulty.

Several advantages are cited for the use of this nickel mesh in preference to scrim or one of the other cotton fabrics commonly employed in marine hatcheries. It evidently has a life of several years, thus eliminating frequent replacement of the tray covering, whereas the best quality of scrim covering must be renewed every 10 or 12 days during a hatching season. Freedom from the necessity of removing and driving tacks in recovering saves the edges of the trays and extends their period of service. Nickel hardware cloth of the same mesh as scrim will remain open to the free circulation of water for many hours after cotton fabric has lost its permeability. It is stated that in collecting cod eggs from the overflow of the spawning cistern the use of scrim has necessitated a change of trays every 2 or 3 hours to overcome clogging, whereas trays covered with the nickel mesh function satisfactorily through 8 to 10 hour periods without attention. The higher first cost of the metal is its chief disadvantage, but it is probable that on a long-time basis its use would result in an appreciable saving.

THE AQUARIUM

The new aquarium, located directly under the main lobby of the Department of Commerce Building, was completed late in February and on March 1 steps were taken for the removal of the aquarium stock from the old Bureau of Fisheries building to the new quarters. The move, completed within a week, involved the transfer of about 250 fish of 20 species, together with all aquarium accessories, equipment, and supplies. A supplementary collection, which had been accumulated gradually and held in Chicago at the John G. Shedd and Lincoln Park aquariums, was brought to Washington on March 16 by means of United States Fisheries car No. 7. This collection comprised 255 specimens of 24 species, in addition to a number of trout which had been transported by the car from the Montana station and other stations en route. When fully stocked the aquarium constituted a splendid display of the fresh-water fishes native to this country. Five small aquaria, maintained under balanced conditions, were stocked with the popular tropical aquarium fishes, making a most interesting exhibit and demonstrating the possibilities of handling fish with artificial light only. With the installation of a background of local rock and aquatic plants, many of the aquaria provide a good representation of the native habitat of the fishes shown. The aquarium is equipped with 3 tanks of 2,000 gallons capacity, 20 holding 1,000 gallons, and 24 of 50 gallons capacity. There are now on display approximately 550 specimens, representing 46 varieties of food, game, and predacious fishes, in addition to turtles, frogs, and several odd brackish water types. Six large and six small aquaria are on a small refrigerating system which is used during warm weather to provide cold water for the trouts. A water storage capacity of 1,500 gallons is available and is frequently used in the holding of fish destined for distribution.

Part 2.—DISTRIBUTION OF FISH AND FISH EGGS

[E. C. Fearnow, Superintendent of Distribution]

Notwithstanding the limited output at the rescue stations along the Mississippi River, the bureau was able to fill practically all of its applications for the so-called warm-water fishes in the Middlewestern States from its pond stations at Langdon, Kans., Fairport, Iowa, and Miles City, Mont. The total output of the three stations aggregated 21 large carload shipments.

In distributing the bureau's annual output of fish, its distribution cars traveled a total of 110,996 miles of which 11,479 were free. Detached messengers traveled 364,044 miles of which 68,261 were free. Automobile trucks in making deliveries of fish traveled 64,965 miles.

The following table summarizes the distribution of fish and fish eggs during the fiscal year to applicants in the United States and its Territories. It also shows the plants of fish made by the bureau in public waters of the country in connection with the propagation of commercial fishes, and the salvage of fish from temporarily flooded lands.

Summary, by species, of the distribution of fish, 1932

State and species	Number
Alabama:	
Catfish	1, 350
Rainbow trout	1, 500
Largemouth black bass	375, 920
Sunfish	203, 190
Alaska:	
Sockeye salmon	19, 920, 512
Humpback salmon	317, 000
Brook trout	77, 050
Arizona:	
Rainbow trout	25, 000
Loch Leven trout	200, 000
Brook trout	25, 000
Largemouth black bass	225
Sunfish	100
Yellow perch	225
Arkansas:	
Catfish	150
Rainbow trout	23, 680
Crappie	2, 700
Largemouth black bass	101, 330
Smallmouth black bass	112, 500
Rock bass	25, 300
Sunfish	7, 900
California:	
Chinook salmon	19, 662, 300
Atlantic salmon	25, 000
Colorado:	
Steelhead salmon	150, 000
Rainbow trout	892, 310
Black-spotted trout	660, 700
Loch Leven trout	224, 890
Lake trout	100, 000
Brook trout	2, 728, 490
Largemouth black bass	4, 450
Crappie	5, 375
Sunfish	53, 500
Yellow perch	2, 875
Connecticut:	
Catfish	500
Rainbow trout	2, 850
Brook trout	20, 950
Smallmouth black bass	24, 000
Yellow perch	36
Delaware:	
Crappie	450
Largemouth black bass	1, 650
Sunfish	250
Florida:	
Largemouth black bass	140
Georgia:	
Catfish	2, 040
Rainbow trout	230, 000
Brook trout	23, 500
Largemouth black bass	364, 580
Warmouth bass	270
Sunfish	231, 965
Idaho:	
Catfish	375
Chinook salmon	2, 528, 500
Rainbow trout	1, 518, 000
Black-spotted trout	2, 465, 000
Largemouth black bass	4, 300
Illinois:	
Silver salmon	200, 000
Rainbow trout	2, 700
Loch Leven trout	2, 500
Crappie	1, 875
Largemouth black bass	13, 895
Sunfish	1, 100
Yellow perch	140
Indiana:	
Catfish	8, 670
Rainbow trout	12, 450
Loch Leven trout	39, 600
Brook trout	58, 100
Crappie	4, 190
Largemouth black bass	32, 890
Smallmouth black bass	23, 600
Sunfish	48, 165
Yellow perch	2, 295
Pike perch	1, 500, 000
Iowa:	
Catfish	4, 408, 200
Buffalofish	255, 680, 300
Carp	239, 000, 000
Rainbow trout	172, 105
Brook trout	1, 200
Pike and pickerel	66, 260
Crappie	1, 318, 400
Largemouth black bass	24, 447
Sunfish	1, 320, 200
Yellow perch	9, 010
White bass	12, 935
Fresh-water drum	120
Miscellaneous fishes	512, 000
Kansas:	
Catfish	5, 200
Rainbow trout	22, 268
Crappie	12, 880
Largemouth black bass	10, 215
Sunfish	7, 375
Yellow perch	600
Kentucky:	
Rainbow trout	5, 350
Crappie	500
Largemouth black bass	71, 040
Smallmouth black bass	65, 672
Rock bass	300
Sunfish	6, 850
Louisiana:	
Catfish	75
Crappie	250
Largemouth black bass	845
Sunfish	16, 160
Maine:	
Atlantic salmon	1, 088, 450
Landlocked salmon	943, 800
Lake trout	300, 000
Brook trout	988, 000
Smallmouth black bass	16, 100
Cod	915, 741, 000
Winter flounder	2, 243, 417, 000
Maryland:	
Rainbow trout	108, 370
Brook trout	40, 550
Largemouth black bass	52, 750
Smallmouth black bass	4, 895
Sunfish	7, 760
Massachusetts:	
Catfish	6, 710
Rainbow trout	55, 100
Loch Leven trout	100, 000
Brook trout	234, 420
Mackerel	15, 245, 000
Smallmouth black bass	50, 000
Pike perch	510, 000
Yellow perch	456
White perch	325
Cod	713, 025, 000
Haddock	800, 151, 000
Pollock	14, 670, 000
Winter flounder	815, 707, 000
Michigan:	
Whitefish	8, 470, 000
Steelhead salmon	74, 000
Landlocked salmon	25, 000
Rainbow trout	21, 800
Loch Leven trout	47, 200
Lake trout	24, 960, 750
Brook trout	1, 205, 000
Crappie	500
Largemouth black bass	6, 940
Smallmouth black bass	7, 800
Sunfish	11, 450
Pike perch	36, 800, 000
Yellow perch	950
Minnesota:	
Catfish	3, 313, 900
Buffalofish [1]	24, 655
Carp [1]	3, 423, 100
Rainbow trout	52, 475
Loch Leven trout	19, 800
Lake trout	312, 750

[1] Rescued fishes planted in Mississippi River.

Summary, by species, of the distribution of fish, 1932—Continued

State and species	Number
Minnesota—Continued.	
Brook trout	154, 860
Pike and pickerel	11, 770
Crappie	3, 960, 200
Largemouth black bass	143, 815
Smallmouth black bass	400
Sunfish	4, 374, 000
Pike perch	15, 960, 000
Yellow perch	210, 180
White bass	1, 805
Fresh-water drum	525, 375
Miscellaneous fishes	3, 160, 570
Mississippi:	
Largemouth black bass	311, 770
Smallmouth black bass	125
Sunfish	261, 925
Missouri:	
Catfish	1, 500
Rainbow trout	251, 388
Crappie	23, 125
Largemouth black bass	82, 091
Smallmouth black bass	5, 825
Rock bass	1, 000
Sunfish	31, 930
Montana:	
Catfish	7, 325
Whitefish	5, 000, 000
Silver salmon	500, 400
Landlocked salmon	13, 000
Rainbow trout	3, 016, 427
Golden trout	5, 690
Black-spotted trout	3, 080, 000
Loch Leven trout	10, 914, 200
Brook trout	374, 100
Crappie	29, 775
Largemouth black bass	3, 000
Sunfish	448, 650
Yellow perch	45, 005
Miscellaneous fishes	15, 000
Nebraska:	
Catfish	22, 560
Largemouth black bass	15, 560
Rainbow trout	117, 860
Loch Leven trout	128, 900
Brook trout	126, 400
Sunfish	9, 500
Yellow perch	10, 825
Nevada:	
Rainbow trout	525, 000
Black-spotted trout	1, 347, 200
New Hampshire:	
Catfish	300
Landlocked salmon	7, 800
Rainbow trout	17, 200
Lake trout	4, 000
Brook trout	347, 090
Smallmouth black bass	12, 400
New Jersey:	
Loch Leven trout	1, 500
Brook trout	8, 000
Crappie	750
Largemouth black bass	6, 819
Smallmouth black bass	1, 000
Sunfish	7, 800
Yellow perch	275
New Mexico:	
Catfish	8, 000
Chinook salmon	200, 000
Rainbow trout	1, 494, 000
Black-spotted trout	75, 000
Brook trout	105, 900
Crappie	600
Largemouth black bass	71, 740
Sunfish	10, 600
Yellow perch	1, 350
New York:	
Catfish	290
Cisco	23, 000, 000
Whitefish	410, 000
Chinook salmon	5, 000
Steelhead salmon	35, 000
New York—Continued.	
Landlocked salmon	275, 000
Rainbow trout	46, 500
Loch Leven trout	196, 575
Lake trout	58, 800
Brook trout	386, 685
Crappie	1, 710
Largemouth black bass	24, 706
Smallmouth black bass	233, 310
Sunfish	14, 400
Yellow perch	2, 134, 763
Pike perch	960, 000
Winter flounder	98, 154, 000
North Carolina:	
Glut herring	55, 000, 000
Rainbow trout	208, 300
Loch Leven trout	102, 100
Brook trout	129, 900
Crappie	300
Largemouth black bass	281, 505
Rock bass	1, 800
Sunfish	21, 446
Yellow perch	11, 560, 120
White perch	7, 000, 000
Striped bass	1, 676, 000
North Dakota:	
Catfish	125
Crappie	900
Largemouth black bass	900
Sunfish	2, 240
Ohio:	
Catfish	3, 120
Whitefish	61, 000, 000
Chinook salmon	1, 000
Silver salmon	250, 020
Steelhead salmon	50, 000
Rainbow trout	3, 400
Loch Leven trout	300
Brook trout	5, 050
Crappie	4, 300
Largemouth black bass	20, 380
Smallmouth black bass	56, 700
Sunfish	5, 030
Pike perch	442, 600, 000
Oklahoma:	
Catfish	5, 127
Rainbow trout	15, 966
Crappie	27, 595
Largemouth black bass	40, 347
Sunfish	74, 645
Yellow perch	375
Oregon:	
Chinook salmon	4, 054, 870
Chum salmon	22, 000
Silver salmon	737, 900
Steelhead salmon	750, 000
Loch Leven trout	120, 000
Brook trout	2, 500
Pennsylvania:	
Catfish	31, 411
Common sucker	17, 275, 000
Rainbow trout	299, 637
Loch Leven trout	211, 800
Lake trout	3, 000
Brook trout	927, 781
Crappie	14, 476
Largemouth black bass	19, 393
Rock bass	120
Sunfish	73, 671
Yellow perch	5, 461
Pike perch	43, 494, 000
Rhode Island: Brook trout	200
South Carolina:	
Rainbow trout	31, 630
Loch Leven trout	6, 600
Brook trout	22, 850
Largemouth black bass	216, 292
Rock bass	500
Warmouth bass	5, 800
Sunfish	97, 200

Summary, by species, of the distribution of fish, 1932—Continued

State and species	Number
South Dakota:	
Catfish	7, 100
Rainbow trout	90, 500
Loch Leven trout	417, 150
Brook trout	454, 050
Largemouth black bass	1, 750
Sunfish	5, 500
Yellow perch	12, 075
Tennessee:	
Catfish	700
Rainbow trout	109, 350
Loch Leven trout	68, 500
Brook trout	121, 150
Crappie	200
Largemouth black bass	110, 305
Smallmouth black bass	2, 000
Rock bass	4, 000
Sunfish	41, 306
Texas:	
Catfish	1, 820
Crappie	17, 055
Largemouth black bass	481, 560
Rock bass	8, 800
Warmouth bass	1, 100
Sunfish	151, 130
Rio Grande perch	22, 900
Yellow perch	225
Utah:	
Chinook salmon	500, 000
Rainbow trout	1, 040, 686
Black-spotted trout	730, 975
Loch Leven trout	29, 000
Lake trout	100, 000
Brook trout	251, 000
Vermont:	
Steelhead salmon	25, 900
Landlocked salmon	34, 541
Atlantic salmon	2, 000
Rainbow trout	500
Loch Leven trout	76, 000
Lake trout	103, 000
Brook trout	1, 089, 089
Grayling	1, 063
Largemouth black bass	330
Smallmouth black bass	5, 000
Pike perch	28, 510, 000
Yellow perch	58, 600, 000
Virginia:	
Catfish	950
Shad	29, 757, 600
Rainbow trout	131, 243
Loch Leven trout	121, 080
Brook trout	384, 386
Pike	1, 500
Largemouth black bass	232, 725
Smallmouth black bass	15, 994
Rock bass	11, 900
Virginia—Continued.	
Sunfish	170, 075
Yellow perch	112, 492, 000
Washington:	
Chinook salmon	22, 354, 600
Chum salmon	18, 169, 750
Silver salmon	5, 375, 500
Sockeye salmon	22, 875, 145
Humpback salmon	8, 544, 800
Steelhead salmon	1, 385, 000
Rainbow trout	84, 900
Black-spotted trout	1, 403, 000
Loch Leven trout	266, 600
Brook trout	37, 870
Dolly Varden trout	2, 462, 000
West Virginia:	
Catfish	2, 550
Rainbow trout	317, 190
Loch Leven trout	14, 800
Brook trout	1, 066, 780
Crappie	4, 000
Largemouth black bass	34, 108
Smallmouth black bass	44, 325
Rock bass	5, 100
Sunfish	31, 520
Wisconsin:	
Catfish	4, 321, 980
Buffalofish	150, 875
Carp	5, 085, 500
Rainbow trout	580, 200
Loch Leven trout	275, 900
Brook trout	1, 201, 000
Pike and pickerel	38, 860
Crappie	1, 736, 840
Largemouth black bass	89, 805
Smallmouth black bass	2, 300
Sunfish	2, 198, 675
Pike perch	1, 575, 000
Yellow perch	52, 140
White bass	1, 025
Fresh-water drum	25
Miscellaneous fishes	372, 225
Wyoming:	
Catfish	12, 400
Chinook salmon	100, 000
Silver salmon	65, 280
Rainbow trout	1, 990, 000
Golden trout	50, 400
Black-spotted trout	5, 838, 920
Loch Leven trout	1, 900, 600
Lake trout	100, 000
Brook trout	1, 222, 410
Grayling	40, 000
Crappie	9, 450
Largemouth black bass	9, 375
Sunfish	65, 440
Yellow perch	7, 945

METHOD OF DISTRIBUTION

Blanks on which application for fish may be made are furnished to applicants on request. These blanks call for a complete description of waters to be stocked and from the information furnished the bureau determines the species that are suitable.

Upon receipt of the applications the applicants are notified in regard to the species that will be furnished and the approximate date of delivery and are given instructions for receiving and caring for the consignment. Before shipment is made a second notice is given, usually by telegram, stating the exact time the fish will arrive at the railroad station. Fish are delivered at the railroad stations of applicants free of charge.

Applicants are expected to provide suitable receptacles for carrying fish, such vessels to be in readiness at the railroad station specified in the advance notice of delivery. The vessels should be uncovered and empty.

The bureau experiences considerable difficulty in making deliveries of fish to points on branch lines where the train service is poor. It will facilitate delivery if the applicant will designate a railroad station on a line where there is good train service.

It frequently occurs that shipments of fish are forwarded a great distance and the messenger in charge must make deliveries to a number of applicants at different points. In order to facilitate deliveries, the messenger sometimes asks applicants to meet their fish at a point other than the one designated on the application.

In making allotments of fish the bureau takes into consideration the area of the water to be stocked, the size and number of fish available, and the distance the fish must be transported. The bureau distributes fish as fingerlings and yearlings. However, at some stations it is necessary to distribute a portion of the output as fry to prevent overcrowding.

Shipments of trout from the bureau's eastern stations are usually made during May and June and applications received after April 1 will be carried on file for attention during the following year. The distribution of trout in the Rocky Mountain regions is made from May to October and applications for that section should be submitted prior to May 1 in order to assure early delivery. Requests for bass, sunfish, and crappie should be made prior to May 1 as deliveries of such species are made between May and December.

Detailed information on the bureau's method of distribution is contained in Fisheries Circular No. 8 entitled "Stocking Interior Waters of the United States."

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